

# NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

WIRED WINDOWS



Our weekly Windows connectivity column debuts this week. See page 9L.

## SystemView advances

IBM's upgraded AIX version supports object frameworks.

By Michael Cooney  
Raleigh, N.C.

IBM this week will fill in another piece of its management vision for distributed client/server computing.

According to sources briefed by IBM, the company will announce SystemView for AIX Version 1 Release 2, which will add a litany of new features. These include object-oriented performance monitoring tools for client/server systems and SAP AG's R/3 programs, as well as new software distribution capabilities.

"We need a simple way of administering the complete array of information systems and products that are in a distributed

See SystemView, page 8

### TOP CONCERNS OF IBM CUSTOMERS

1. Enterprisewide systems management
2. Mainframes and enterprise servers
3. Interoperability
4. Enterprisewide security and authentication
5. Client/server computing
6. Network management
7. Enterprisewide storage and data management
8. Application development technologies
9. Collaborative and workgroup computing
10. Workstation/LAN robustness

Based on a survey of Share members. Share is an IBM user group comprising over 1,700 member organizations.

## Java tool from Netscape and Sun no average Joe

By Peggy Watt  
Mountain View, Calif.  
Netscape Communications Corp. and Sun Microsystems, Inc. are

out to animate the Internet with the announcement this week of JavaScript, a cross-platform, object-oriented scripting language for crafting more active Web sites.

JavaScript should make it easier for developers to populate World-Wide Web pages with audible and animated interactive screen elements, according to sources at both firms. Today, programmers must use the Java language itself, which lacks an easy-to-use development environment.

The scripting tool, jointly developed by the two companies, will be distributed royaltyfree by

See Netscape, page 12

## Defense orders groupware detente

Microsoft and Lotus told to build Exchange/Notes bridges.

By Ellen Messmer  
Washington, D.C.

The U.S. Defense Department intends to strong-arm Microsoft Corp. and Lotus Development Corp. into developing interoperable versions of Exchange and Notes.

With a billion-dollar budget and a million users, the Defense Department has the best chance of any single organization to bring Microsoft and Lotus to the bargaining table. But the success of the effort, like the intervention in Bosnia, is uncertain.

Under the giant Defense Message System (DMS) contract awarded this June, Microsoft will build a version of Exchange that meets the X.400 and security requirements for the military's

next-generation messaging system, said Tom Clarke, DMS program manager at the Defense Information Systems Agency (DISA). Because Lotus is a DMS contractor, it will support the same technologies in a DMS-compliant version of Notes.

But the Defense Department



DISA's Wayne DeLoria and Tom Clarke lay out requirements for interoperable versions of Exchange and Notes.

is seeking more than just mail compatibility.

See DMS, page 77

## Exchange copies Notes

By Carol Sliwa and Peggy Watt  
Boston

During the past year, Lotus Development Corp. has taken shots at Microsoft Corp.'s upcoming Exchange Server for its lack of client replication capability. Now the veteran groupware provider may want to take back some of those words.

See Exchange, page 74

## Cabletron to buy its way into fast Ethernet

By Jodi Cohen  
Rochester, N.H.  
Customers gave Cabletron Systems, Inc. a big thumbs-up last week for the company's decision to abandon its go-it-alone ap-

proach to internetworking and offer \$77.5 million for Standard Microsystems Corp.'s (SMC) switching division.

The proposed acquisition — Cabletron's first — will give the

company low-end switching gear and fast Ethernet technology. Cabletron traditionally has focused on the high end of the LAN hub and switch market.

See Cabletron, page 10

### NOS evolution

## NT Server fans look beyond cost

By Charles Bruno

Wall Street investment banking house Cowen & Co. deploys strategic applications on high-end Unix servers today, but the company is keeping a close eye on Windows NT Server as an economical application platform for tomorrow.

"When we look for an application now, it's with the purpose of running it on an NT ma-

See NT Server, page 50

### THE PRICE OF UPGRADING YOUR SERVER OS

Number of users	Windows NT Server 3.51 (new license)	Upgrade from NetWare to Windows NT Server 3.51	NetWare 4.1 (new license)	Upgrade from NetWare 3.X to NetWare 4.1
10	\$999	\$839	\$2,495	\$995
25	\$1,468	\$1,113	\$3,695	\$1,495
50	\$1,999	\$1,349	\$4,995	\$1,995
100	\$3,299	\$1,999	\$6,995	\$2,795
250	\$7,199	\$3,949	\$12,495	\$4,995

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Links to Java programming tips and tools.

Link to <http://www.nwfusion.com>.  
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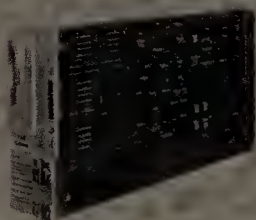
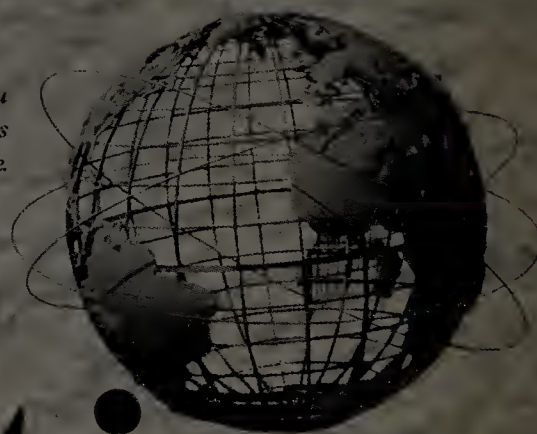




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## This Week

### The Front Page:

Download Microsoft white papers on the future of the Exchange server and a rebuttal from Lotus. Read an article detailing how Lotus is gearing up for a secure, military-only version of Notes. Get background info on Netscape and Java, and on competing efforts from Microsoft and Oracle.

### The Technical Sections:

Check out how different groups of Realtors are selling houses on-line, in Electronic Commerce. Compare NFS offerings from a slew of vendors, in Local Networks.

**Your side:** Read the story on AT&T NetWare Connect Services and then discuss whether you'd want to outsource your internal net, in [nwfusion.talk](#).

**Technology Resources:** We've beefed up the Client/Server page with articles and other resources on migrating to client/server.

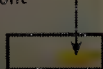
**Professional Development:** New seminars.  
**DirectConnect:** Download demo software.  
**Network World Central:** Get in touch with us.

## This week's pick

Need to know more about data warehousing? Larry Greenfield's Data Warehousing Information Center is a well organized collection of white papers, how-to articles and vendor information for data warehousing, OLAP and related fields. <http://www.starnetinc.com/pwp/larryg/index.html>.

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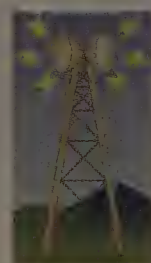
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**NetworkWorld's Mission:** To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.

## VEXED BY VLANs?



CINDY CHARLES

Three customers shared their experiences at the VLANs: Virtual LANs and Switches conference. Separately, 3Com maps out its VLAN strategy. See stories, page 76.

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## News briefs, December 4, 1995

**Microsoft's 'Net plan**

Microsoft Corp. this week will lay out an Internet strategy, which consists of new Web servers, security technology, client-based access products and development tools. The plan is intended to allay investors' fears and heighten those of competitors. The Redmond, Wash.-based market leader's stock tumbled 3 1/2 points last week after Goldman, Sachs & Co. analyst Rick Sherlund lowered his investment rating on the stock, claiming Microsoft lags in its Internet and Web offerings.

**Database dump**

The industry's leading database vendors this week will shower the market with new offerings, most of which will debut at DB/Expo 95 in New York. Informix Software, Inc. will roll out software for Web-enabling applications based on its OnLine database as well as a partnership with Netscape Communications Corp. Rival Oracle Corp. will announce Enterprise Manager, a platform for managing distributed Oracle databases, replication sessions and the company's SQLNet networking software from a single point. Sybase, Inc. plans to roll out SQL Anywhere 5.0, a version of its low-end database that includes built-in replication and is compatible with the company's SQL Server database. And Microsoft Corp. is expected to announce Version 6.5 of its Microsoft SQL Server database. One of the key additions anticipated will let users copy data between SQL Server and non-Microsoft databases that support the Open Database Connectivity interface.

**Cable & Wireless 'Net gain**

Cable & Wireless plc last week said it plans to set up eight Internet access points that will be up and running by May 1, 1996, where private users and Internet access providers can connect at speeds up to E-3, or 34.3M bit/sec. Called Cable & Wireless Internet Exchange, the platform will allow companies to route Internet traffic regionally rather than forcing everything through the U.S. Access point sites are Australia, Bermuda, France, Germany, Japan and Sweden, as well as Hong Kong and London.

**New horizons**

Open Horizon Corp. this week will announce Application Broker, a product that lets workgroup applications written with client/server tools such as PowerBuilder or Visual Basic interact with network-based transaction systems, application servers and hosts. An array of high-end tool vendors and transaction monitor vendors are integrating their offerings with Application Broker, which will be available by April for \$195.

**Messaging translator**

Sprint Corp. last week introduced a managed service at EMail World under which it will translate between different multiple electronic mail formats and provide message transport across the wide area. The InfoXchange service, based on a hub designed by Control Data Systems, Inc., is targeted at large corporations and government agencies seeking to unify heterogeneous messaging systems.

**Plugging into frame relay**

Motorola, Inc.'s Information Systems Group last week introduced a PC serial card-based frame relay access device designed to let users in branch office environments plug directly into a frame relay service. The Vanguard 100 PC comes with two ports and optional ISDN or data service unit components. The board supports PPP, SLIP, TCP/IP and Synchronous Data Link Control-to-Logical Link Control conversion. The board is available now and priced starting at \$749.

**Analyze this**

Gartner Group, Inc. last week agreed to buy Dataquest, Inc., a unit of The Dun & Bradstreet Corp., for about \$80 million in cash and securities. The agreement unites two of the leading market research firms that cover the network and computer product industry.

## NetWare Connect now on market

By Joanie Wexler

*Bridgewater, N.J.*

AT&T's second network application service hit the streets last week when the carrier announced that its AT&T NetWare Connect Services (ANCS) had finally graduated from test mode to commercial availability.

ANCS — announced more than a year and a half ago — follows the launch of AT&T Network Notes, which became commercially available in August (NW, Aug. 14, page 15). The two offerings, along with AT&T's recently announced Easy World Wide Web Services, represent early steps in the carrier's ambitious quest to eventually host all

the applications and servers in its network that customers would otherwise buy, run and manage on their own premises.

Cost, in addition to the increasingly distributed nature of companies, are drawing users to network-hosted services such as ANCS. Tom Evslin, AT&T vice president of gateway services, defined the service simply as "outsourcing complexity, capital costs and operating costs."

Hallmark Cards, Inc., an early ANCS trial customer for a 1,200-person mobile sales force application, said it would have cost \$250,000 to \$300,000 to build the infrastructure that AT&T can offer on its own premises.

"And we are seeing no performance degradation compared with dialing in to the [NetWare] host directly," said Mike Goodwin, telecommunications and network manager at Hallmark.

Read articles on AT&T's plans for the Internet, NetWare and Lotus Notes. Link to <http://www.nwfusion.com>. Select then



ANCS, unlike Network Notes, does not carry a monthly fee for hosting and management services. Instead, those charges are bundled into network usage fees. ANCS runs on AT&T's InterSpan frame relay transport net, so — in line with InterSpan's pricing structure — users pay monthly port and permanent virtual circuit (PVC) charges. The port and PVC fees range from \$300 to \$5,000 per month.

Certified public accounting firm McGladrey & Pullen in Minneapolis has signed on for ANCS because "it looks like it will be cheaper to have AT&T handle the server management," said Ken Thygesen, managing director of the firm's technology infrastructure group. He said remote computing is a "fairly new phenomenon" in his company and he is looking for ways to support it with a staff of 10 micro-computer specialists.

And old perceptions die hard with some customers. Bryan Paxson, communications manager at Freightliner Corp. in Portland, Ore., said he doesn't really care how inexpensive network-hosted LAN services from AT&T get. He pointed to AT&T's history of failures with Unix and its StarLAN local network offerings, as well as its inability to make its PC business — acquired from NCR Corp. — thrive.

"AT&T is damn good at switching calls," said Paxson, whose company is a huge user of AT&T voice and data transport services. "But they've had too many false starts [in other areas] to make me secure about their ability to take on outsourcing when it has to do with a LAN."

At the ANCS launch, AT&T also announced that ANCS users would have the ability to access CompuServe and AT&T Business Network — both on-line services — through ANCS during the first half of 1996. ■

## Madge first with full ATM25 suite

By Jodi Cohen

*San Jose, Calif.*

Madge Networks, Inc. last week rolled out a suite of Asynchronous Transfer Mode workgroup products that let users take advantage of ATM's quality-of-service and scalability benefits in the LAN.

Analysts said Madge Networks is the first vendor to actually deliver a full suite of ATM workgroup products. IBM and Optical Data Systems, Inc. have both announced ATM25 product lines, but neither are shipping.

The Collage family of products, which is derived from Madge Networks' stake in White-tree Networks, Inc., includes two adapter cards for the PCI bus: a 25M bit/sec ATM (ATM25) adapter for PCs, plus a 155M bit/sec adapter for servers. Madge Networks also announced the Collage 250 workgroup ATM switch, which supports 12 ATM25 ports and can be stacked up to 12 high.

In addition, Madge Networks rolled out the Collage 280 Ethernet/ATM switch, which supports workgroup switching for both ATM25 and existing switched Ethernet users.

With the adapter card change, the device allows each of the 12 desktop ports to automati-

cally adapt to switched Ethernet or ATM25.

Thomas Nolle, president of CIMI Corp., a consultancy based in Voorhees, N.J., said the Collage 280 device is particularly useful. Net managers usually find that users who require ATM often are scattered around the network, Nolle noted.

"The ability of a port to switch identity allows a net manager to put the switch in a wiring closet and support both Ethernet and ATM users," he said.

Beta user Michael Blakeslee, executive vice president and chief scientist at ThunderWave, Inc. in Rockville, Md., was eager to get his hands on ATM25 gear.

"Our company blends digital video, audio, music, still pictures, text and graphics into interactive multimedia entertainment or educational tools," he said. "So we obviously have big-bandwidth needs that require ATM."

The Collage 25 PCI adapter is priced at \$430, and the Collage 155 PCI adapter is priced at \$1,295. The Collage 280 switch lists for \$7,795. All are available now. The Collage 250 ATM switch is priced at \$6,995 and will be available in the first quarter.

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# AT&T offers virtual access to InterSpan

By Joanie Wexler

Basking Ridge, N.J.

AT&T last week unveiled a Virtual Gateway Service (VGS) that lets virtual net customers access AT&T's InterSpan frame relay offering via switched digital and analog modem connections.

Today, InterSpan only can be accessed via dial-up links using

AT&T's Information Access Service, an analog dial-up service in which traffic traverses an X.25 network en route to the InterSpan network.

Adding the switched digital support will enable users of AT&T's Software-Defined Network and other virtual network services to dial in to InterSpan at

64K, 128K and 1.5M bit/sec speeds. Traffic will be billed at the virtual network's discounted rate, and access minutes will count toward fulfilling customers' contracted minimum usage.

SDN customer Navistar International Corp. in Chicago has been beta-testing an SDN-to-InterSpan access method since June as a faster and less expensive way to connect dealers, customers and remote workers to Navistar frame relay-based resources.

Those sites had been dialing in through another carrier's packet-switched network, which was slow by today's high-speed LAN standards and afforded no volume discounts, said Fred Kester, Navistar voice and video services manager and a member of the SDN Users Association executive committee.

## AT&T MAKES FCC FILING

**AT&T, facing a deadline to either convert all its user frame relay deals into contract tariffs or renegotiate them entirely, has made a filing with the FCC asking the commission to reconsider its order forcing long-distance carriers to file frame relay rates. The tariff filing requirement is due to take effect Dec. 18.**

"Users want to leverage the networks they have in place and make them as cost-efficient and integrated as possible," agreed Linda Tratnik, association president and a user of AT&T's SDN services. Companies have to reach more smaller sites that don't justify dedicated access, she said, "and this is a way to get to everyone."

Besides SDN, the service supports AT&T's Virtual Telecommunications Network Service (Tariff 12) and OneNet, a service that combines SDN with toll-free 800 services.

Here's how the new access works: Users in small offices across the country dial up a local AT&T node via an analog line, an ISDN Basic Rate Interface or a Primary Rate Interface. The data call is switched through the SDN network to the VGS platform.

VGS multiplexes the traffic streams, converts the signals to frame relay and spits them out over one shared pipe into a common InterSpan port. The multiple traffic streams can also share permanent virtual circuits (PVC) through the InterSpan network to the corporate server.

## AT&T's virtual network access to InterSpan



AT&T's new Virtual Gateway Service enables virtual network customers to access the carrier's InterSpan frame relay offering via switched digital and analog modem connections. Traffic will be billed at discounted rates.

Sharing such resources means big cost savings, particularly since, by definition, dial-up users are occasional users. Justifying what can be a \$4,000-per-month frame relay port charge for an individual telecommuter or even a small office would be tough, said Christine Heckart, broadband consultant at TeleChoice, Inc., a Verona, N.J.-based consulting firm.

In AT&T's case, some virtual private net features, such as call blocking, net management and security, translate over to frame relay customers on the access leg of the trip, said Dick Slezak, managing director of AT&T global switched digital services.

It is unclear if the AT&T Inter-

Span group will offer "direct" access to its InterSpan network for users that are not virtual network customers, though that would be technically possible.

For example, AT&T's frame relay switch vendor, StrataCom, Inc., offers a front end to its IPX switch — the Intelligent Network Server. INS takes in PRI streams and performs the multiplexing and signaling conversion functions like VGS does. Users could make local calls directly to that server, if it was available.

In the future, VGS will hook SDN users to other nets, such as the Internet, AT&T's InterSpan Asynchronous Transfer Mode network and other on-line information networks, Slezak said. ■

## Variations on a theme

The idea of aggregating dial-up users onto a single frame relay port is not unique to AT&T. Rivals MCI Communications Corp. and Sprint Corp. offer similar capabilities but in slightly different ways.

Sprint lets remote users access its frame relay net across its Virtual Private Network (VPN) or Clarity voice services using local switched 56K bit/sec services or ISDN Basic Rate Interface links, said Brad Hokamp, Sprint's director of advanced data services. This differs from the AT&T approach only in that AT&T accommodates the masses with support for analog dial up and ISDN.

Usage charges appear on the VPN invoice. Volume discounts are available, although the calls may be rated as off-net to on-net. This usually incurs a higher charge than on-net to on-net calls.

MCI Communications Corp. handles access to its HyperStream frame relay network a bit differently than Sprint and AT&T. It offers an end-to-end remote LAN access package deal to users at a flat monthly price.

MCI's Remote LAN Dial package includes use of the MCI public switched telephone network to get to a port in an access server pool. Twelve access server ports are included in the monthly cost. From the access server, user traffic goes through a Cisco Systems, Inc. gateway to the MCI frame relay network, based on Bay Networks, Inc. BNX switches.

The package also includes the cost of the entry-point BNX port, shared by multiple MCI users, and one permanent virtual circuit per user that links the frame relay net to the user's corporate server.

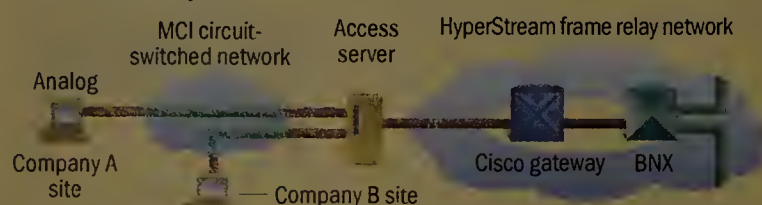
The only user costs above the flat monthly fee are access charges to users' local exchange carriers and usage charges across the MCI circuit-switched network.

Robert Rasmussen, senior manager of access services at MCI, said there would "definitely be an advantage" to letting users substitute MCI's virtual private network (Vnet) for the public switched telephone network. He said MCI intends to offer the Vnet option when it launches ISDN access to the HyperStream network during the first half of 1996, basically leveling the playing field for the Big Three.

By David Rohde and Joanie Wexler

## THE MCI METHOD

MCI's Remote LAN Dial option aggregates users over the MCI telephony network, not over its Vnet virtual private network. The Vnet option will emerge along with ISDN access next year.



Users from multiple companies share one port, which streamlines costs but poses potential security risks. Each user is assigned his own PVC, included in the monthly end-to-end remote access service cost.

GRAPHIC BY TERRI MITCHELL

## SystemView

Continued from page 1

environment," said John Norris, the networking topic advocate for Guide International Corp., a large IBM user group. The Share, Inc. user group recently rated enterprisewide systems management as its top concern.

To achieve these lofty goals, SystemView for AIX 1.2 will contain two new object-based applications — Application Manager for R/3 and a performance monitor for client/server systems.

The IBM package automatically discovers R/3 resources and registers them to the central SystemView console. It also will track the performance and availability of distributed R/3 applications.

Initially, SystemView will only track R/3 applications running on IBM AIX or Hewlett-Packard Co. HP-UX workstations, but additional vendor support is expected next year.

The Performance Monitor application will employ IBM's Common Agent Architecture (CAA) to let users monitor and control the performance of applications across the enterprise. CAA is based on the Desktop Management Task Force's Desktop Management Interface.

These applications use IBM's System Object Model and Distributed SOM code, as well as

Common Object Request Broker Architecture.

That will enable users to view object-based application data from one screen and write automation programs that allow application interaction, simplifying overall management of the enterprise, analysts said.

"The ability to manage the SAP environment will be a great boon for users," noted Anura Guruge, an independent analyst based in New Ipswich, N.H. "However, SystemView, as well as other vendor efforts in this arena, have been painfully slow in rolling out."

IBM will also announce:

■ A new SystemView agent that will gather statistics from SNA devices such as 3745 front-end processors, giving users a real-time view of SNA environments.

■ Integration of its Nways Campus Manager for LAN and ATM products, as well as its Remote LAN Monitor products, which will let users monitor Token-Ring, Ethernet, FDDI and campus ATM devices from a SystemView monitor.

■ A software distribution feature for NetView Distribution Manager, called Single Node Option, that will let a central NetView DM/6000 server download software to a single remote node, which, in turn, can deliver the software to other remote nodes at scheduled intervals. ■



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# Workflow software vendors establish links to the Web

By Barb Cole

Action Technologies, Inc. this week will take the wraps off Action Workflow Metro, a software suite that enables a standard Web browser to serve as a client in an Action workflow application.

Metro is aimed at firms looking to build Web-based customer service applications or use the Web for workflow applications inside the corporate firewall.

Action's Metro has two components: Metro Application Center, a group of ready-to-use workflow applets, and Metro Development Center, a development environment for creating Web-based custom workflow applications. To the end user, Metro appears as a set of forms that are launched from a company's home page.

"Right now, there's no workflow software to tie in people and procedures via the Internet, and developing such applications is expensive and slow," said Rodrigo Flores, vice president of product management at Alameda, Calif.-based Action.

Flores said Metro's sales-call request, customer inquiry and customer service applets will let companies get Web-based customer service applications up and running quickly. Metro also includes prebuilt applications for automating internal processes — such as human resources, engineering and MIS — via the Web.

"[Action] has taken some basic interactions between a company and its customers, and shrink-wrapped those simple workflows into a set of trackable Web applications," said Bruce Silver, president of Bruce Silver Associates, a market research firm in Weston, Mass. "Its angle — that it saves a company the hassle and expense of writing the Web server application in [Common Gateway Interface] script — makes sense to me."

Silver observed that Action "seems to be the first independent software vendor to exploit Netscape Communications, Inc. Netscape Commerce Server for transaction security."

Users liked the idea of building Web-based workflow systems but had concerns about security.

"We envision a day when people can dial in to our system via the Internet, but at this time, I don't trust the firewall security enough to open it up," said Kelly Catron, management analyst at

Clark County Board of License in Las Vegas. The county, which issues business as well as gaming and liquor licenses, built an Action-based workflow system to automate the process.

Metro requires the Action Workflow System. It runs on Windows NT servers and supports Microsoft SQL Server databases, Netscape Commerce Server and any Web browser.

Action will charge \$40,000 for Metro Application Center but has not detailed how much the development tools will cost.

## The Ultimius approach

Separately, Ultimius LLC later

## Putting workflow on the 'Net

Company	Plans	Availability
Action Technologies	Action Workflow Metro, which allows any Web browser to become a client for the Action Workflow System.	Now
Ultimius	Ultimius WebFlow, which lets users graphically link fields in an HTML form with variables in a workflow process.	January

this month will unveil a new version of its workflow system that will let customers graphically link fields in an HTML form with variables in a workflow application. Ultimius will include Web functionality as part of Ultimius 1.7, expected later this month.

The WebFlow component of Ultimius 1.7 will enable customers to launch workflow processes from any Web browser, according to Rashid Khan, president of Ultimius. The new version also

will include a Lotus Development Corp. Notes client for including Notes users in workflows, as well as an electronic mail agent for launching workflow processes by sending messages, he added.

Ultimius 1.7 costs \$2,950 for a Workflow Starter Kit, which includes Ultimius Engine, Designer, Administrator and five clients.

©Action: (510) 521-6190; Ultimius: (919) 233-7331.

# National caller ID crippled by exceptions

By David Rohde

Washington, D.C.

The long-awaited debut of national caller ID took place last Friday, but don't be surprised if you didn't notice.

The Federal Communications Commission late Thursday bucked a swarm of protests and declared that national caller ID would go into effect as scheduled on Dec. 1, but with such a long list of exceptions that the service could be almost invisible for several months.

In the biggest loophole, the FCC said long-distance carriers *See Caller ID, page 12*

## Cabletron

Continued from page 1

"I've been clamoring for a 100Base-T switch module for my MMAC-Plus for a while," said John Scoggin, supervisor of network operations at Delmarva Power in Newark, Del. "If the SMC deal means that the fast Ethernet stuff will ship earlier, then that's good news."

Cabletron's effort to buy its way into the fast Ethernet market also pleased Barbara Maaskant, director of information services at the Rollins School of Public Health at Emory University in Atlanta.

"I'm eager to get my hands on 100M bit/sec boxes in order to enhance my horizontal traffic, and this should help speed things along," she said.

With the deal, Cabletron would gain a five-slot modular LAN switching hub that supports Ethernet, token-ring and FDDI switching. It also would get a stand-alone Ethernet switch offering 12 or 24 ports and a stand-alone fast Ethernet switch offering eight or 16 ports (see graphic). According to most analysts, these products comple-

ment Cabletron's high-end Multi Media Access Center and MMAC-Plus modular switching hubs, as well as its stand-alone SmartSwitches.

But Tom Bain, a research analyst at META Group, Inc., a consultancy in Reston, Va., said there is some product overlap.

SMC's EliteSwitch (ES)/1 modular chassis directly competes with Cabletron's MMAC product line and may end up being phased out.

"Anyone who is considering buying the ES/1 might want to look elsewhere," he said. "Cabletron will certainly support the product, but it's questionable how much the switch will be enhanced."

Upon completion of the deal — expected in about 60 days — Cabletron will announce its fast Ethernet strategy, which will be based on SMC products and Cabletron technology under development.

Cabletron plans to start offering SMC's products as soon as the deal is finalized and add fast Ethernet switch modules for the MMAC and MMAC-Plus in the first half of 1996, said Cabletron Chief Executive Officer Robert Levine.

All SMC products will be managed under Cabletron's Spectrum net management platform and incorporated into its Synthesis architecture for migrating users from shared-media LANs to switched virtual networks.

But questions remain about whether the SMC gear will be successfully integrated into Cabletron's virtual networking strategy.

"I'm not sure how [Cabletron] will retrofit the SMC equipment to work into its virtual

## How SMC's products would fit in

SMC's low-end switches and fast Ethernet gear complement Cabletron's high-end hubs and switches.

### LAN backbone:

▶ Cabletron's MMAC-Plus switching hub

### Wiring closet:

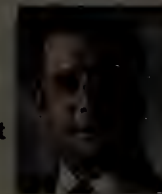
▶ Cabletron's MMAC switching hub  
▶ SMC's ES/1 switching/routing hub

### Workgroup:

▶ Cabletron's MicroMMAC hub  
▶ SMC's TigerSwitch XLE and 100 switches

"Combining Cabletron's LAN switching technologies and SMC's fast Ethernet technologies will give our customers the comprehensive range of switching solutions they'll need."

Robert Levine, CEO, Cabletron



networking scheme," Bain said. "This could be a big question mark."

Even Levine admitted that he is not sure if the SMC products will be able to work within Cabletron's virtual networking scheme.

He said the company might need to upgrade some of the SMC gear with new Application Specific Integrated Circuits that match the Cabletron equipment. Otherwise, the SMC products may not be able to take advantage of the promised policy-based management features associated with virtual networking.

## Merger motivation

Industry observers said that the motivation behind the SMC deal stems from Cabletron's quiet fear of being left behind by its competition: 3Com Corp., Bay Networks, Inc. and Cisco Systems, Inc.

Most analysts agreed that the company needed to make a significant move to remain a top-tier player.

Currently, Cabletron ranks last in revenue among the four networking heavyweights.

Unlike its competitors, Cable-

tron has steered clear of making any acquisitions and instead relied on internal development and partnerships.

Meanwhile, Wellfleet Communications, Inc. merged with SynOptics Communications, Inc. to form Bay Networks, and Cisco and 3Com each gobbled up an array of hub, switch and remote access vendors.

"Although Cabletron is a very independent-minded company, they were wondering if they had the momentum to compete against a few sizable competitors," said Pat Springer, principal consultant at CTG, Inc., a consultancy in Buffalo, N.Y.

Analysts said that with its first acquisition under its belt, Cabletron may look to make additional strategic purchases in other key areas, such as remote access and token-ring switching. Cabletron officials declined to be specific but said the company will review what is on the market and pursue anything that would be a good fit. ■

## COMMENTS?

See "How to reach us" on page 5.

## MORE ON-LINE

Cabletron officials explain their purchase in a Q&A available on-line.

Link to <http://www.nwfusion.com>.

Select News+ then Front Page.





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# New tool ties Web to back-end apps

By John Cox  
Boston

ParcPlace-Digitalk, Inc. last week unveiled one of the first full-blown tool sets for building World-Wide Web servers that can interact with corporate database and server applications.

Beta testers report that the new VisualWave tool set has enabled them to quickly build prototype applications that let end users equipped with Web browsers take advantage of back-end applications.

The Vanguard Group, one of

the country's largest direct marketers of no-load mutual funds, is using VisualWave to build what it calls the "next-generation 800 number." This interactive Web server will let customers see account information, do financial planning and take other actions, all of which are actually handled by corporate application servers.

Another beta tester, Dun & Bradstreet Information Services, is using the tool set to create Web access to its vast storehouse of business data. The company's

customers will be able to query mainframe databases, select reports and pay for them by credit card via the Web interface. "[Web deployment] is the start of the next wave of distributing applications over the network," said Melinda-Carol Ballou, a senior analyst at META Group, Inc. in Stamford, Conn. "ParcPlace-Digitalk is the first vendor with a fairly complete, fairly graphical development environment that runs over multiple operating systems."

Both Sun Microsystems, Inc. and NeXT, Inc. have recently announced products that do at least some of what VisualWave does, but they lack the multiple platform support, Ballou said.

VisualWave is based on ParcPlace-Digitalk's VisualWorks, which is a graphical development environment based on the Smalltalk object-oriented language. The new elements that make up VisualWave automatically generate all the needed Web-related interface code. Other facilities maintain the users' interaction with the application and forge links to networked databases.

Integral Development Corp. is a Palo Alto, Calif., software company that has created — based on the original VisualWorks tool set — an advanced

application for calculating the risk of derivatives trades. The entire system sells for \$2 million to \$3 million to big financial institutions, which otherwise would have to spend millions more to create their own.

Integral wanted to let corporate derivatives traders rent this system for about \$1,000 a month by accessing it through Web browsers, according to Harpal Sandhu, Integral's president.

"But the system has to be a true application that interacts with the user, makes use of real-time data feeds and modifies the underlying databases," Sandhu said. "You can't do this with [static HTML documents]."

But you can do it with VisualWave, and Integral plans to deploy a Web-based version of its RiskNet application next month.

## Free capability

"With well-designed objects — objects designed to be changed — plus the Web, you get so much [capability] for free," Sandhu said. When a customer wanted to make use of a financial

calculation from J.P. Morgan, Integral's engineers wrote a script to run a File Transfer Protocol download from Morgan's server and included the program as part of RiskNet. It took Integral's developers 10 to 15 days to create this, whereas it would take others six months, he said.

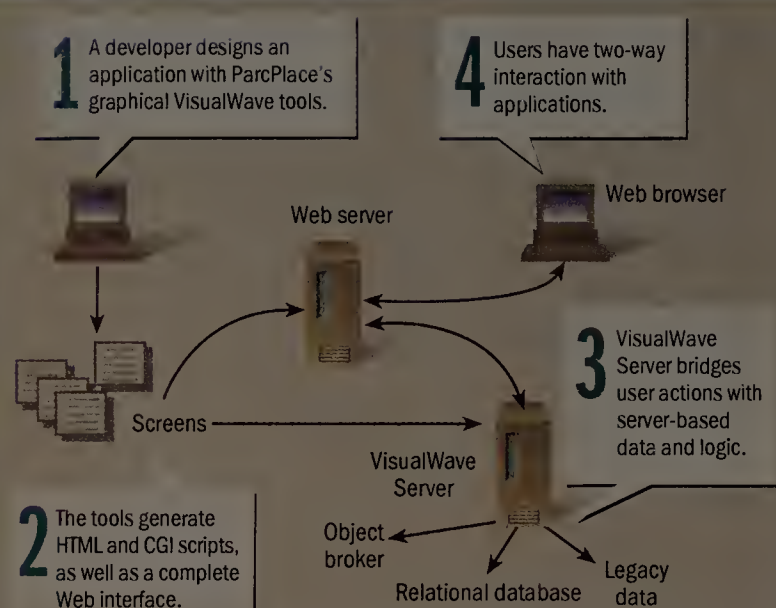
VisualWave will work with Sun's Java application development language, which company officials said is like Smalltalk.

The first release of VisualWave will let developers download and run Java-built programs, called applets. In the future, VisualWave will also support OLE objects running on Microsoft operating systems.

The VisualWave Development Environment will ship this month for Windows 3.1, Windows NT and Windows 95. VisualWave's server component runs initially on several Unix operating systems and Windows NT. Pricing starts at \$4,995 for the development environment and \$9,995 for the server.

©ParcPlace-Digitalk: (800) 759-7272.

## Moving business applications to the Web



## Netscape

Continued from page 1

both to encourage its adoption, sources said. Up to two dozen companies, including several competitors and content providers, are expected to endorse the technology this week.

Among those planning to implement JavaScript support are Informix Software, Inc., Oracle Corp., Intuit, Inc., Digital Equipment Corp., Macromedia, Inc., Open Market, Inc., Silicon Graphics, Inc., The Santa Cruz Operation, Inc., Verity, Inc. and Illustra Information Technology, Inc.

JavaScript came about when Netscape adapted its fledgling LiveScript technology, announced in September, to be compatible with Sun's Java.

Both developers liken JavaScript to Microsoft Corp.'s Visual Basic as a quick interface building tool.

But Sun and Netscape's JavaScript plans contrast with Microsoft's plans for using Visual Basic and its Blackbird development kit to build similar applets atop its fledgling Web servers

and clients.

And while Oracle has licensed Java, it has also embedded a Basic run-time version in its new PowerBrowser for distributing simple applets across the Web and linking clients with back-end Oracle applications.

Java-enabled browsers can download Java applets from Web sites designed with Java, and users can run those applications on their local systems. Likewise, JavaScript can animate elements of an HTML-constructed Web page, which will react distinctively and individually to a Java-enabled browser, including Sun's HotJava and a pending update to Spyglass, Inc.'s Mosaic. The Netscape 2.0 browser already supports Java.

"JavaScript enables developers to associate behaviors with 3D objects on a Web site, and the objects execute locally when they come in contact with a Java browser," explained a member of Sun's development team. "Three-dimensional images on the Internet have been static until Java."

JavaScript's debut comes less than a week after Microsoft

unveiled V-Chat communications, a Virtual Reality Modeling Language technology that supports two- and three-dimensional environments. It lets users represent themselves as on-line icons, which Microsoft calls "avatars," and control their animated gestures through a toolbar at the client. ■

## Caller ID

Continued from page 10

using central office (CO) switches from Northern Telecom, Inc. and Digital Switch Corp. (DSC) would not be required to pass along the calling party number until March 31.

The FCC, therefore, granted a waiver request to many carriers that reported a technical quirk with their Nortel and DSC switches.

Sprint Corp. had reported that when the caller ID field is blank — because the caller blocks it or the local carrier fails to provide it — the switch automatically grabs the automatic number identification (ANI), a different source of the calling

party's number. The resulting passage of the ANI information defeats the caller's right to privacy using an FCC-approved blocking code (NW, Nov. 13, page 30).

In a statement, FCC officials admitted the CO switch exception "frustrates our objective of widespread [caller ID] availability." But commission officials said they had "chosen to err on the side of protecting the option for consumers to choose that their number not be passed."

Corporate users who wish to employ caller ID to kick off database lookups and other computer telephony applications will need to continue to pay for 800 numbers. These numbers automatically deliver ANI with-

would have to show that "effective competitive opportunities" exist for U.S. carriers in the foreign carrier's home markets.

The new standard has been dubbed the "echo test" — for effective competitive opportunities — by FCC officials. Among other things, it makes the commission's impending decision on two big European carriers' applications to buy 20% of Sprint Corp. a very close call.

See FCC, page 74

out blocking privileges, so long as the user maintains a dedicated access line.

In another key exception, the commission said carriers would not have to provide caller ID for any calls originating in California until June 1, due to customer education requirements imposed by the California Public Utilities Commission.

Privately, some observers accused the long-distance carriers of dragging their feet on the technical and legal hurdles because the FCC has denied them the right to receive a portion of the RBOCs' booming caller ID revenues.

Senior Writer Tim Greene contributed to this story.



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Circle Reader Service #39



# ISDN heavyweights team up

By Tim Greene

Some of the biggest names in ISDN banded together last week to make it easier and less expensive to order the increasingly popular digital service.

The group, organized by a BellSouth Corp. executive, specified four standard ISDN service packages that customers will

be able to order from any of the carriers involved. The packages of popular ISDN configurations soon will gain catchy names that are easy to remember.

This simpler provisioning system will cut carriers' costs of setting up the lines, savings that should be passed along to customers, according to carrier officials.

Firms involved are carriers Ameritech Corp., AT&T, BellSouth, NYNEX Corp. and Pacific Bell, and equipment vendors Boca Research, Inc., IBM, Intel Corp., Motorola, Inc. and U.S. Robotics, Inc.

This initiative leapfrogs efforts by the North American ISDN Users' Forum (NIUF) to do the same thing: establish generic ISDN ordering codes that let users specify line configurations by simple names — such as Capability B — instead

## EASY TO ORDER

Major carriers and ISDN equipment vendors have set up four packages to make it easier to order ISDN lines. The packages are based on a basic set of services and a collection of options:

**Basic set:** Voice and data over each 64K bit/sec B channel, three-way conferencing, dropping calls, hold transfer, call forwarding and call ID.

**Options:** Message waiting indicator, call forwarding busy indicator, call forwarding didn't answer indicator.

**Package 1:** Basic set with just one phone number per B channel.

**Package 1A:** Package 1 plus Options.

**Package 2:** Basic set with multiple phone numbers per B channel.

**Package 2A:** Package 2 plus Options.

of by reciting pages of individual central office switch settings.

The NIUF work was proceeding too slowly and producing too many codes — 20, so far — according to the ISDN companies involved in the new effort.

"We felt we needed to go ahead as quickly as possible and could not spend several more months waiting for a more global agreement," said William Smith, vice president of the BellSouth Business Systems broadband business unit and the group's organizer.

But Andrew Kauffman, president of AHK & Associates, an ISDN consulting firm in Schaumburg, Ill., argued that the number of NIUF codes are necessary to give users the option to buy just the capabilities needed for their applications. ■

## Mitsubishi does ISDN

Mitsubishi Electronics America, Inc. has decided that ISDN is cooking and it wants a piece of the pie.

The Japanese giant thinks ISDN capability should be standard in all PC motherboards, and it hopes to provide the silicon chip to make that happen.

The firm last week announced a \$375 ISDN PC card that it will use to gather ISDN marketing data it needs to design its chips, said Steve Sandy, a strategic marketing manager for Mitsubishi's electronic device group.

The firm does not want to get into the PC-card market long-term; rather, it wants to develop a new market for its division that makes computer chips and sees the cards as a logical step.

Mitsubishi envisions that within two years, PC makers will ship their products ISDN-ready, and it wants to be ready to provide the necessary chips.

The card supports Novell, Inc. NetWare and Microsoft Corp. Windows NT, so remote users calling in to a corporate server would appear as clients.

The card will be available by March. Mitsubishi plans to offer an ATM PC card in the middle of next year.

By Tim Greene

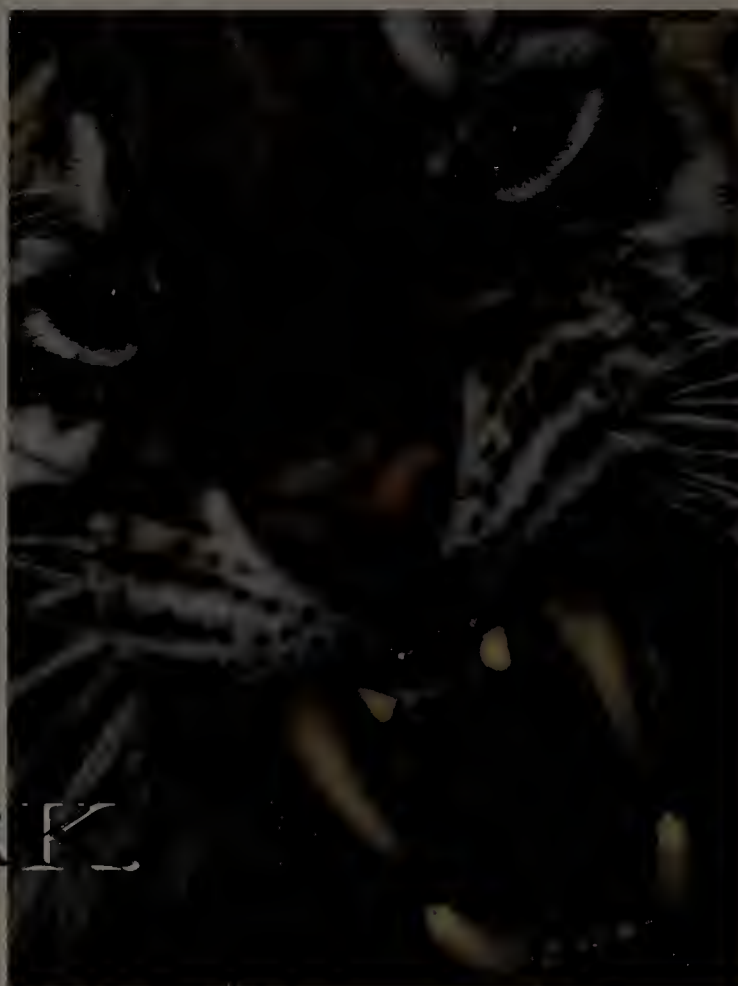
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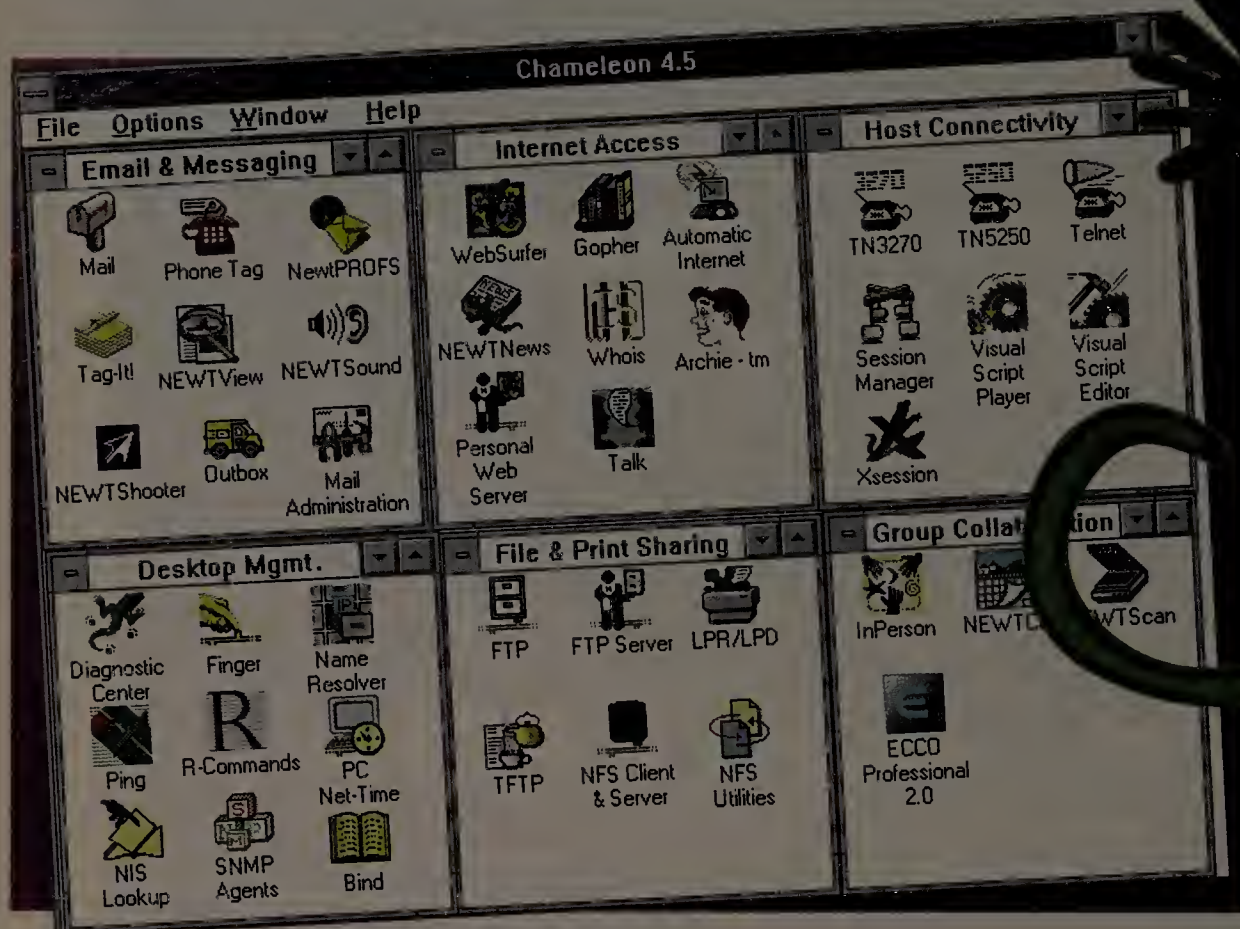
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# WANs & Internetworking

**Covering:** Network Architectures • Net Management • Mobile Computing  
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## Briefs

■ **New software from IBM** lets users **check phone messages via the World-Wide Web**. IBM DirectTalkMail software lets voice mail users listen, delete and save their messages directly from their computers using IBM Internet Connection Web browsers. Users interested in the software can take part in a trial by going to <http://www.husley.ibm.com/dtmail>.

DirectTalkMail voice messaging is part of a new release of IBM's DirectTalk/6000 voice response software, which will be available Feb. 2.

IBM: (800) 426-4211, Ext. 149.

■ **Gandalf Technologies, Inc.** last week announced that its Xpress Connect LANline 5250i remote access router will support **ISDN** at the end of the month. In addition to a Basic Rate Interface ISDN port, the remote access router has two other wide-area ports that support frame relay, leased lines and Switched 56. Pricing starts at \$1,995.

■ **Motorola, Inc.'s Information Systems Group** this week is introducing a PC card-based **frame relay access device** called the Vanguard 100 PC. It is suitable for concentrating branch office traffic and applications such as electronic mail, file transfer and Internet access. It is available immediately at a list price of \$749.

Motorola: (508) 261-1058.

■ **Ascom Timeplex, Inc.** last week announced an upgrade to a server module designed to **conserve PBX bandwidth**. The module, which can handle traffic from up to 16 ports, allocates bandwidth only when a call is set up and chooses the most efficient path through the network. The module works with the ST-1000 Asynchronous Transfer Mode backbone switch and ST-20 switching node. The module costs \$8,000 and will ship in the first quarter of 1996.

## NYNEX to deal on big frame nets

By David Rohde  
Washington, D.C.

NYNEX Corp. is preparing to dangle a huge carrot in front of users with big frame relay networks, all to win business that might otherwise go to a major long-distance carrier.

Starting Dec. 22, the regional Bell operating company intends to offer a 10% discount on both frame relay port charges and all access line charges for big networks, according to a filing at the Federal Communications Commission.

Analysts said the move reflects the little-known but intense competition between certain RBOCs and interexchange carriers (IXC) for big frame relay users.

In fact, the NYNEX offer — known as the FRS Term Commitment Plan — has drawn a protest from MCI Communications Corp. MCI claims that NYNEX did not submit sufficient cost justification required for certain kinds of special deals and new services.

said. That's because the RBOC has the option of creating a separate frame relay cloud in each LATA and buying dedicated links between each cloud, she explained.

### Big break for big nets

**Terms of NYNEX's proposed combined discount on frame relay service and DigiPath Digital Service II, a NYNEX access service:**

**Discount:** 10%

**Applies to:**

- ▶ Frame relay ports
- ▶ DDS II mileage charges
- ▶ DDS II channel termination charges

**Eligible speeds (bit/sec):**  
2,400, 4.8K, 9.6K, 19.2K, 56K

**Term commitment required:** 3 years

**Dates plan is available for ordering:**  
Dec. 22 to June 30

**Minimum number of frame relay ports:** 600

GRAPHIC BY TERRI MITCHELL

SOURCE: NYNEX, WHITE PLAINS, N.Y.

Thomas Bruzzese, NYNEX's staff director of broadband services, confirmed that the offering is aimed at users with locations throughout NYNEX's region. And the RBOC indicated in its FCC filing that if the offer is successful, it could be extended to users whose networks are smaller than 600 ports.

The FRS Term Commitment Plan in some ways echoes the credits and other incentives currently being offered by AT&T and other IXCs to sign up new frame relay business (NW, Nov. 20, page 1).

But it goes a step further by not only chopping the cost of frame relay ports, but also giving a break on other charges associated with

See NYNEX, page 18

## Abandoned Vistium users pick up pieces

By Joanie Wexler

What happens when you buy into a desktop conferencing system and it abruptly ceases to be supported?

In the case of the recently abandoned AT&T Vistium Personal Video System, some users will immediately reevaluate new systems, along with the transport services and WAN equipment needed to support them. Others said they will use Vistium until it runs out of gas.

Regardless of their plans, all users should push AT&T for product buybacks, free upgrades to other systems and anything else they can squeeze out of the company, particularly if they are a national AT&T account, said

See Vistium, page 20

## Proteon powers-up OpenRoute software with key upgrades

By Jim Duffy  
Westborough, Mass.

Proteon, Inc. has unveiled a new version of its routing software that supports two major internetworking standards and includes rerouting and configuration enhancements.

Version 2.0 of Proteon's OpenRoute software features a number of key upgrades, including RFC 1795-compliant Data Link Switching (DLSw), U.S. ISDN support, rerouting around failed WAN links and installation that eliminates the need for local reconfiguration.

OpenRoute is the software found in all Proteon routers. It also has been licensed to IBM, Digital Equipment Corp. and Motorola, Inc.

The new DLSw capabilities extend OpenRoute's original RFC 1434 compliance with multivendor DLSw interoperability enhancements. It also has improved connection setup, circuit prioritization and congestion control, according to Proteon. OpenRoute 2.0's RFC

1795 DLSw implementation is backward-compatible with the RFC 1434 implementation in previous versions of the software, the company said.

The ISDN support in OpenRoute 2.0 means users can now deploy Proteon's RBX 205 line of remote access devices with dial-up ISDN Basic Rate Interface links to central-site routers and the Internet. Until now, ISDN support had been a conspicuous absence from Proteon's remote access product line.

OpenRoute 2.0's WAN Reroute feature, meanwhile, establishes an alternate route in case a primary link fails. WAN Reroute enables a Proteon router to automatically initiate a new connection if the primary link has gone down.

Lastly, OpenRoute 2.0 includes a feature called EasyStart that is designed to ease installation and configuration of Proteon routers. EasyStart eliminates the need for local initial configuration.

Analysts said OpenRoute 2.0

is a conglomeration of checklist items that keeps Proteon competitive with larger players.

"If they are trying to license [OpenRoute], it's pivotal that they enhance the WAN stuff," said Charlie Robbins, vice president of communication research at Aberdeen Group, Inc. in Boston. "It's needed for them to be a viable player. Cisco certainly has a number of these features."

### PROTEON'S OPENROUTE 2.0 FEATURES SUPPORT FOR...

- ▶ RFC 1795 Data Link Switching
- ▶ U.S. ISDN standards
- ▶ WAN link rerouting
- ▶ Easier configuration

Robbins surmised that Proteon had to add these new features before other licensing deals could go forward.

OpenRoute 2.0 is provided as a free upgrade to current Proteon customers with software maintenance agreements. The software currently ships on the company's CNX 500 and 600, RBX 200 and 250, GlobeTrotter and CSX 900ER products.

©Proteon: (508) 898-2800.



# Reseller unveils SNA over frame relay

Motorola FRADs included under new NetSolve offering for managing the service.

By David Rohde

Austin, Texas

Users don't have to wait for AT&T to make its long-anticipated announcement of a managed SNA-over-frame relay offering to get the carrier's InterSpan frame relay service in such a configuration.

That's because one of the nation's handful of AT&T InterSpan resellers has already cooked up its own managed SNA-over-frame relay offering.

Managed network provider NetSolve, Inc. has announced ProWatch for Frame Relay Access Devices (FRAD). Under the offering, which is available now, NetSolve will configure and install at user sites Vanguard FRADs from Motorola, Inc.'s Network Systems Division.

And it will hook up users to AT&T's InterSpan service under a preexisting contract with AT&T for resale of data services.

NetSolve will manage the entire network — from the LAN side of the FRADs outward — with its network management center here.

The control center will take feeds from AT&T's Customer Network Management System and move them into an application running on a Hewlett-Packard Co. OpenView management system.

In addition, NetSolve has integrated the frame relay monitoring application with a carrier

network information database, which includes attributes of diverse local exchange carrier networks, said Michael Turner, NetSolve's vice president of marketing.

In this fashion, the company has integrated backbone diagnostics with local-loop diagnostics and various element managers and protocol analyzers into a single monitoring system, Turner said. This enables NetSolve to offer availability guarantees on its managed frame relay networks, he said. Even a near miss results in a full

## Put my SNA onto frame

The management charge for NetSolve's ProWatch for FRADs:

**\$399 per month**

- ▶ Headquarters sites
- ▶ Hubs in multiple-star networks

**\$99 per month**

- ▶ Remote sites

Note: Price does not include customer premises equipment or carrier transport.

SOURCE: NETSOLVE, AUSTIN, TEXAS

refund of that month's management charges rather than a scaled refund schedule.

NetSolve earlier introduced ProWatch IV Network Management Service for frame relay networks, but the offering runs strictly router-based internets.

The ProWatch for FRADs service is directed at incorporating SNA traffic into the frame relay mix.

The new offering is being aggressively priced, in line with the Motorola Vanguard line's positioning as an inexpensive family of FRADs (NW, Oct. 24, 1994, page 15).

Management of remote sites connected to a single hub costs less than \$100 a month (see graphic), with other managed frame relay offerings, such as those from interexchange carriers, generally costing twice as much, Turner said.

But he cautioned that the price NetSolve obtains from AT&T for users' frame relay transport will generally be a street price, thus minimizing the opportunity to take advantage of big credits carriers are now using to sign frame relay deals (NW, Nov. 20, page 1).

Unlike most resellers of circuit-switched telecommunications services — which obtain bulk discount capacity in advance and find discount customers later — frame relay resale is provisioned one customer at a time, Turner explained.

NetSolve obtains wideband circuits such as T-1 and T-3 lines, then sells them in smaller chunks such as 64K bit/sec DS0 circuits, which command a higher price per unit of throughput, he explained.

©NetSolve: (512) 795-3000.

## NYNEX

Continued from page 17

the access lines from the customer premises to the carrier's frame relay switch (see graphic,

page 17).

Although NYNEX already offers certain discounts for frame relay networks and access lines in exchange for a three-year commitment, the FRS Term

Commitment Plan pulls the discounts together and offers new, more flexible features that are important to the largest users, Heckart noted.

For example, a user does not have to maintain the same sites on the frame relay plan but can add and subtract them during the term of the contract so long as the average remains above 600.

## Sore spot

But the MCI protest hits a sensitive button, since the FCC has repeatedly discouraged RBOCs from crafting special discounts for large users while leaving everyone else to buy services at full price (NW, July 17, page 26).

MCI asked the FCC to reject the offering. However, the commission also has the option of suspending the offering while it works on collecting additional comment in order to make a ruling. ■

## BusinessBriefs

**Attachmate Corp.** last week signed a letter of intent to purchase **The Wollongong Group, Inc.** Wollongong sells an object-oriented Internet browser called Emissary and a variety of TCP/IP applications. Details were not disclosed.

**IBM** last week said it will form a new business unit to develop software products for the Internet. No one has been named to lead the group, which will be made up of at least 100 employees.

**ACT Networks, Inc.** last week announced its intent to acquire all stock

of privately held **Presticom, Inc.** for about \$8.7 million.

Montreal-based Presticom develops SNA-related products such as its BCX-6000 frame relay access device.

**Micom Communications Corp.** said its Marathon Integration Multiplexer and NetRunner Integration Router product families have been certified by AT&T, Sprint Corp. and LDDS WorldCom for use with the companies' frame relay network services.

## Be patient for PCS

The FCC's rules for making the transition from old to new licensees of the 2-GHz spectrum

- ▶ April 1995: Two- or three-year voluntary negotiating phase between all A and B microwave carriers. A and B refer to the first two competing services in a region.
- ▶ April 1997: Floating one-year mandatory negotiating phase for A and B blocks can begin after this date once PCS licensees notify incumbents of their intent to build. Following this phase, licensees can force incumbents to move if no agreements are reached by providing them with a network "comparable" to what they have now.
- ▶ 2005 (up for comment): Licensees no longer obligated to compensate microwave incumbents.

# PCS community demands too high for microwave users?

Net operators lobby Washington to speed up negotiations.

By Joanie Wexler

Washington, D.C.

Possession may be nine-tenths of the law, but that isn't deterring the upstart personal communications services (PCS) community from trying to hasten the departure of incumbent microwave users from their turf.

Now that the PCS wireless spectrum auctions are over, the new licensees are lobbying Congress hard to help them speed up negotiations with incumbent microwave users. The incumbents must relocate from the 2-GHz band before the PCS operators can set up their nets.

The Cellular Telecommunications Industry Association (CTIA), for one, is firing off letters on behalf of PCS licensees, claiming that they are being held hostage by some incumbent users for outrageous monetary and other demands.

The CTIA is asking Congress for legislation that would equalize the bargaining power of PCS licensees and incumbent users in hopes of hastening negotiations and the delivery of PCS services.

"There is no question that some extortion is going on that is holding up the buildout of the [PCS] networks," said Thomas Wheeler, CTIA president.

He pointed to the Suffolk County Police Department in New York, which is allegedly demanding \$18 million and a total digital rebuild of its microwave net, even though only one link reportedly interferes with the PCS licensee's frequencies. Replacing that one link would only require changing radios for a cost of about \$300,000 to \$400,000, Wheeler said.

## They have their reasons

But existing microwave users have their reasons for being cau-

tious. Many of them run business-critical functions such as power monitoring that cannot be interrupted, said Jack Richards, a partner with the law firm Keller and Heckman based here, which represents several incumbents.

And microwave network users that migrate to a hybrid of analog and digital links will face "excess expense and reliability risks" as signals get converted, he said.

Richards added that when the Federal Communications Commission put together the rules under which the 2-GHz spectrum would be taken over by PCS network operators, it stipulated a two- or three-year voluntary negotiating period between new and old licensees following completion of the auctions (see graphic). The longer voluntary negotiating period was assigned to those using their nets for public safety.

"The word 'voluntary' means just that: [Incumbent] users are under no obligation to drop what they're doing and negotiate at all," Richards said. "But if they do, they can lay their demands on the table and go from there. That's what negotiating means."

According to Wheeler, when the FCC rules were written, they assumed "good-faith negotiating" that would bring the networks up faster. "Incumbents have the right" to ask for whatever they want, he conceded, "but they are being irresponsible."

The FCC recently issued a Notice of Proposed Rulemaking reaffirming the negotiating periods originally stipulated. The agency tweaked the wording so PCS licensees could share the cost of appeasing a microwave incumbent when the incumbent's network was affected by more than one licensee. ■



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# Wall Data, Attachmate ease NT integration

By Michael Cooney  
Kirkland, Wash.

Wall Data, Inc. and Attachmate Corp. this week will unveil software that makes it easier to integrate Microsoft Corp. Windows NT and Windows 95 applications with IBM or Digital Equipment Corp. host resources.

Wall Data is enhancing its flagship Rumba Office with new software called Rumba Office 95/NT, a 32-bit multihost emula-

tion package that includes new networking and OLE support. It provides for simultaneous access to multiple host systems, such as IBM mainframe and Application System/400 mid-range computers, as well as Hewlett-Packard Co. servers, from a single graphical interface on the Windows NT or Windows 95 PC.

The new package will support IBM's Multiprotocol Transport Networking (MPTN) and Cisco

Systems, Inc.'s Native Client Interface Architecture (NCIA). MPTN lets applications communicate regardless of the underlying network protocol. NCIA lets SNA applications communicate over a TCP/IP backbone.

"Both of these technologies will enable users to incorporate existing SNA applications into newer TCP/IP-based environments without a problem," said Mark Upson, group manager for Wall Data.

In order for the product to work, however, users must have VTAM 4.2 or higher on the mainframe and OS/400 Release

3 on an AS/400.

Rumba Office 95/NT will also beef up its support of OLE 2.0, Microsoft's object-oriented application environment. A new feature, called Rumba Notebook, will let users incorporate data from multiple host applications, Microsoft Office applications and database queries to create a single customizable OLE-based application. The company is also adding support for Oracle Corp., Sybase, Inc. and Informix Software, Inc. databases.

"Within the Notebook container, host sessions can be maintained to automatically update any of the data within the application in the notebook," Wall

Data's Upson said.

Rumba Office 95/NT will be available by the end of this month for \$500.

Attachmate will be offering new OLE support of its own. The company is announcing a new version of its Kea, its Digital host-emulation software. The new 32-bit Kea will let Windows 95 users link to Digital VAX, Alpha AXP and Ultrix hosts.

The software supports OLE 2.0, which lets users pull host data and drop it into a Windows applications for a user on the workstation.

Kea is available now and is priced starting at \$245.

©Wall Data: (800) 915-9255; Attachmate: (800) 426-6283.

## Vistium

Continued from page 17

Albert Lill, vice president and research director at Gartner Group, Inc., a Stamford, Conn.-based consultancy.

"AT&T is a premier supplier and said it would support this product" when it began shipping less than two years ago, Lill said.

"For them to suddenly withdraw it is not acceptable. Users should beat the hell out of them," she added.

There are about 6,400 Vistium systems installed today. AT&T's Global Information Solutions (GIS) division, which makes Vistium, recently decided to quit supporting the product after this year (NW, November 20, page 14).

That decision followed AT&T's recent announcement that it would split into three companies, none of which had a role for GIS. AT&T has said it will sell GIS when it becomes profitable.

To help out, AT&T World-Worx Network Services, the group that runs the company's multimedia interoperability service, last month started offering users deals if they change to Intel Corp. ProShare systems before next spring. Some resellers also are offering deals on other vendors' systems.

But some users worry that the wide-area transport structure they have in place also will have to change — and if so, they're wondering what that will cost.

Bassett Healthcare, a teaching hospital that stretches throughout upstate New York, has been using the Accunet Switched 56 Service transport option for its Vistium network.

ProShare, however, is limited to ISDN wide-area links as a switched option.

"I'm not sure yet what it will cost to retool," said Martha Gorman, manager of telemedicine teleconferencing at Bassett. "It's not clear if we will have to put in new WAN equipment" to support ISDN, she said.

Analysts said Gorman probably could get by with products known generically as ISDN converters, which translate Switched 56 traffic into an ISDN format.

Pricing for those products ranges from \$2,000 to as much as \$100,000 for special configurations, Lill said.

Gorman said she also is considering a private network to eliminate the headache of getting consistent WAN services throughout Bassett regions, which span four area codes. But that option would preclude outside entities from participating in Bassett conferences.

Caterpillar, Inc. in Peoria, Ill., is "very disappointed" that Vistium will not be forever, according to Kristi Moushon, senior systems analyst at the company.

Caterpillar chose the Vistium line last year for project collaboration among international and domestic sites because the product was "the best," Moushon said, particularly for video quality.

"We'll keep on using the Vistiums for video until they don't work anymore," Moushon said. In the meantime, new systems installed at Caterpillar will be ProShare or PictureTel Corp. PCS 100. And when all systems support a stable T.120 standard for data conferencing among different makers' systems, "we'll change the old systems," she said.

Moushon said her biggest headache likely will be training users on new systems, "but technically, [changing systems] is not a problem." ■

*"AT&T is a premier supplier and said it would support this product. For them to suddenly withdraw it is not acceptable. Users should beat the hell out of them."*

## WAN MONITOR

### AT&T has a worthy defense on NNI

**A**T&T endured some scorching press when it announced earlier this year that it had tested the frame relay Network-to-Network Interface (NNI) and found some problems with using it to interconnect two networks. We believe AT&T has some valid concerns.

The goal we are seeking here is end-to-end management and service reliability. You cannot manage or guarantee what you cannot see, understand or control. Nowhere is that more true than in frame relay, where different frame relay nets can speak totally different languages.

To illustrate the problems that AT&T is concerned about, consider talking with a bloke from Australia. You both speak English, but are you really communicating? If you say "hub," an Aussie will wonder what on earth a "harb" is (pronounced "haub"). Trust us, it happened.

Talking face-to-face with someone provides a real-time management channel to signal alarms if a critical bit, like this little "r", is misplaced. You can tell if you are being understood based on facial expressions and guttural sounds (the Tim Allen "UuhA?" is the equivalent of a red alarm).

But controlling the quality of communications and passing meaningful alarms when there are problems is difficult when connecting two frame relay networks. This was, and still is, AT&T's point.

Despite a firm standard for frame relay, every frame relay network is not designed, managed or operated the same way. There are variations in the way the standards are interpreted and in the way features such as bursting are supported. Some equipment vendors take the basic frame relay standard and spice it up a bit, adding in proprietary morsels that may make the platform more appealing to some carriers.

Today, AT&T uses an enhanced version of the NNI to deliver its international frame relay service, which is part of the WorldSource program. Most of AT&T's frame relay WorldPartners employ the StrataCom platform, so they can use the enhanced NNI, which relies on proprietary signaling.

The enhanced NNI allows AT&T and its partners to pass detailed alarm information and better

control the end-to-end quality of service. The standardized NNI cannot do this.

The NNI has another weakness: It cannot route around network failures. In order to circumvent this problem, AT&T installs its own switch as its international gateway node in each foreign country. This allows it to extend the self-healing backbone network to the foreign

country. This architecture limits the physical distance of the NNI to only a few feet, minimizing the risk of a failure on this portion of the two interconnected networks that is not self-healing.

The Frame Relay Forum is working on improving the implementor's agreement for NNI connectivity. It is defining a resilient NNI that can route

around network failures. In the meantime, carriers are coming up with a few innovative solutions of their own.

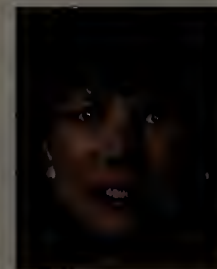
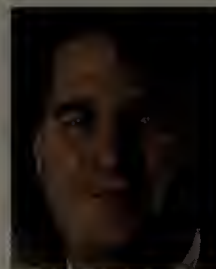
For example, many of the problems posed by NNI can be worked around if the carriers ensure their respective network operations centers have the necessary network management tools and procedures to make problem isolation and resolution go more smoothly.

UniSpan, an international consortium of carriers based in the U.S., has successfully used NNIs to create the world's largest frame relay network. Most UniSpan members use a Cascade Communications network platform so end-to-end congestion management is consistent networkwide. The members also have standardized operations and maintenance procedures for making net implementation and maintenance transparent to end users.

This is just much more labor-intensive than if the exchange of detailed management information and end-to-end quality control were mechanized, which is what AT&T is doing with its enhanced NNI.

So we can take AT&T off the rotisserie now and look for our next victim to batter and fry.

*Briere is president and Heckart is director of broadband at TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at danny\_briere@telechoice.com or christine\_heckart@telechoice.com.*



**Daniel Briere and Christine Heckart**



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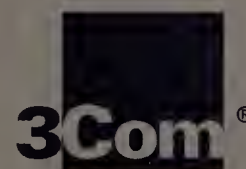
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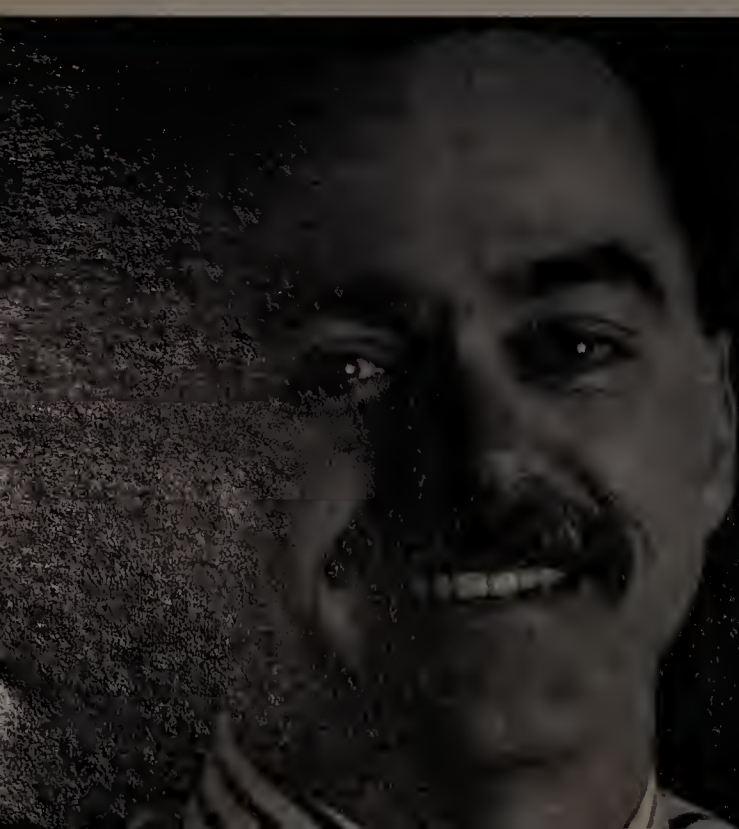
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- Support for standard IBM multipoint SNA applications

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# LAN World

A Special Monthly Section for LAN Decision Makers

## INSIDE LAN WORLD

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CompTIA-tested technicians get A+.

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Dave Kearns lays out tools to link Win95 to NetWare.

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Melinda LeBaron and Skip MacAskill on Cabletron's plan to buy part of SMC.

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## Briefs

The Linksys Group of Irvine, Calif., this month expects to ship a five-port **EtherFast Switching Hub** that supports direct communication between 10M bit/sec 10Base-T network segments and 100M bit/sec fast Ethernet networks.

The EtherFast Switching Hub provides four 10M bit/sec 10Base-T ports and one 100Base-TX fast Ethernet port, supporting backbone speeds of up to 140M bit/sec. It also supports Simple Network Management Protocol and includes a data flow buffer, automatic partitioning and error-detection functions. It is priced at \$1,999.

Linksys: (800) 546-5787.

Alameda, Calif.-based **Farallon Computing, Inc.** is shipping redesigned, smaller versions of its **EtherMac** and **EtherWave** transceivers, which provide computer and printer connectivity to 10Base-T networks. The company incorporated most of the EtherWave functions into a single Application Specific Integrated Circuit, reducing the transceiver's size by 40%.

Pricing ranges from \$9 for the EtherMac units to \$109 for the EtherWave attachment unit interface.

Farallon: (510) 814-5000.

## Peering into Win95

By Joanne Cummings

If you're looking to upgrade to Windows 95 solely for its peer networking capabilities, don't. You can get similar features and capabilities elsewhere with less work and expense.

But if you're running Microsoft Corp.'s latest desktop operating system anyway, it provides a good way to handle any peer file and printer sharing that crops up, analysts and users said.

Speaking of his department's use of Windows 95, Jay Brynild, engineering designer and systems administrator at Innovative Designs, Inc., said, "We're in the process of upgrading all of our machines to [Microsoft's] Office 95 anyway."

His department at Innovative Designs, a medical instruments company in Hopkinton, Mass.,

uses the operating system to share files created with a 32-bit version of AutoCAD.

"Everybody's happy, and it was not a big expense. It was basically the software upgrade price. And it was extremely easy," Brynild said.

But for users that have not upgraded to the new operating system and are still running 16-bit applications on 386-class machines, Windows 95 is probably not the optimum peer networking solution.

"What if you're a departmental manager, your company is running NetWare, and you're interested in taking advantage of a local printer or sharing a package within just your department?" questioned Stan Schatt, LAN research director for Computer Intelligence Infocorp, Inc.

## Vendors get in line to release NFS products for Windows

FTP, SunSoft target mixed Unix and Windows networks.

By Ben Heskett

A trickle has turned into a steady flow of products designed to tie Windows platforms into networks based on Unix and Network File System (NFS) technology.

On the heels of NetManage, Inc.'s NFS for Windows NT announcement in mid-November, FTP Software, Inc. has launched products for turning NT systems into NFS servers as well as for linking NT and Windows 95 clients to NFS servers.

Separately, SunSoft, Inc. introduced a version of its NFS client software that runs on Windows 95 machines and includes a handful of new features, such as a Netscape Communications Corp. World-Wide Web browser. The company said it plans to offer NT desktop products for NFS nets in the future but declined to provide details.

FTP's assault on the integrated Windows/Unix market includes three offerings: InterDrive NT Server 1.0, OnNet32 for Windows 95 and Windows NT, and OnNet Server 2.0.

InterDrive NT Server is a 32-bit NFS implementation for NT servers that supports Windows 95, Windows NT and Unix clients. It also includes a print server.

The new OnNet32 client software turns 32-bit Windows 95 and NT machines into NFS clients. The clients can access Unix-based NFS servers or servers running FTP's new InterDrive NT Server software. The software includes electronic messaging, document conversion and terminal emulation applications, as well.

The third new offering, Version 2.0 of FTP's OnNet Server, features improved TCP/IP

consultancy in La Jolla, Calif.

"If you had a choice between upgrading all of your PCs to Windows 95 and then having to upgrade the hardware, too, or paying less than \$100 per workstation and getting something like [Artisoft, Inc.'s] LANtastic running on top of NetWare and doing it out of your own budget, which is the more viable solution in the short run? The LANtastic solution is far more cost-effective," Schattsaid.

### Lock, stock and barrel

Windows 95, however, offers some compelling peer networking capabilities. It includes the entire feature set of Microsoft's previous peer-to-peer networking solution, Windows for Work-

groups. "Peer networking was a very important feature for most of our users, so we built it right within Windows 95," said Rob Bennett, a product manager for Microsoft's Personal Systems Division.

The operating system also has user-level security, a new feature that is a boon for large firms that want more security and control over departmental peer nets.

"User-level security provides peer nets with a sort of centralized authentication capability," said Ram Tackett, an industry analyst for Currid & Co. in Houston. "You can have your accounts database on either an NT server or on a NetWare server and point all your Windows 95 peer clients back there to find out who can share and who can't, and what their passwords should be."

For example, Tackett said Windows 95 users can enable peers to share their C drives simply by selecting them from the NT or NetWare bindery. The server handles the authentication and passwords, streamlining the process.

The other way is via share-level control. This enables peers to share C drives if they have the appropriate password. Unfortunately, there is no way to prevent peers from giving out the password to other users who should not have access to the drive resources, Tackett said.

See Win95, page 5L

### MORE THAN MEETS THE EYE

Companies trying to determine the cost of upgrading to Windows 95 might be surprised by some of the hidden costs associated with such a move, according to Gartner Group of Stamford, Conn. Here's a breakdown of per-user charges a company might encounter during a software-only upgrade.

Windows 95 upgrade	\$50
Cost of purchase	\$35
Windows 95 installation	\$50
Training of IS and end users	\$400
Support department review	\$50
Help desk calls	\$35
Three application upgrades	\$300
Cost of purchasing upgrades	\$35
Upgrade installations	\$75
End-user training for upgrades	\$350
Upgrade support costs	\$50
Help desk upgrade calls	\$35
Total	\$1,465

address administration, among other things.

InterDrive NT Server will have an introductory price of \$249 until after March, when it will cost \$349. FTP's OnNet32 clients cost \$450 per user, while OnNet Server 2.0 is priced at \$249.

SunSoft, meanwhile, is offering two clients in one with its PC-NFSpro 2.0 release. The product gives Windows and Windows 95 users access to NFS servers, but also lets them run 32-bit Win-Sock-compliant applications at the desktop.

PC-NFSpro 2.0 runs on Intel Corp. processor-based machines and is designed as a Windows 95

migration tool. It should be fully Windows 95-compliant by spring.

Among the applications included in the software are Netscape's Navigator Web browser and a News Reader, which provides access to Internet bulletin boards and Usenet discussion groups.

Version 2.0 also includes built-in support for SunSoft's PC-Admin application, which enables centralized management of PC-NFSpro desktops.

PC-NFSpro 2.0 costs \$349 per user; upgrades are priced at \$89 per user.

©FTP: (800) 282-4387; SunSoft: (800) 786-7638.

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# Remote LANs and user expectations call for centralized mgmt. operation

By Alex Cullen

Except in small organizations, LANs are likely located at a distance from one another, centralized information resources and the technical support staff necessary to keep them operating and up-to-date.

The technology for connecting LANs into a cohesive network, although not simple, is straightforward. However, the task of administering, supporting and maintaining LANs remains distributed and inefficient. Compounding this, these LANs contain many separate but interdependent hardware and software components, resulting in an environment that is both more changeable and, at times, more difficult to change.

With greater use and changeability of LANs colliding with budget and head count constraints, a set of high-level operational goals emerges. These goals, which apply to hardware and software for LAN clients, servers and network components, are:

- Reduced need to physically access a computer or server for maintenance.
- Enhanced mean time to repair through better monitoring, faster response time and better focusing of expertise.
- Automation of repetitive functions such as software distribution and configuration.
- Improved ability to track assets and measure performance.
- An easier way to change the LAN environment.

Net managers can meet these goals most effectively by implementing a plan for performing a wide range of desktop, server and network management functions from a central site. This calls for the establishment of a remote LAN service center.

Properly equipped, a remote LAN service center can provide a wide range of capabilities encompassing network and server management, data backup and recovery, client and application support, software installation, help desk and inventory/asset management.

In general, the more of these a service center provides the more valuable it is. But the right set of services for an environment is determined by the installed LAN products and the overall information technology operational model.

Implementing a centralized,

comprehensive support center can be broken down into five steps: information gathering, requirements definition, tool selection, implementation planning and implementation. Along the way, network managers will need to decide what LAN components will be managed centrally and what tasks can be performed. What's more, they have to decide what tools, procedures, standards, expertise and staffing will be needed.

## Information gathering

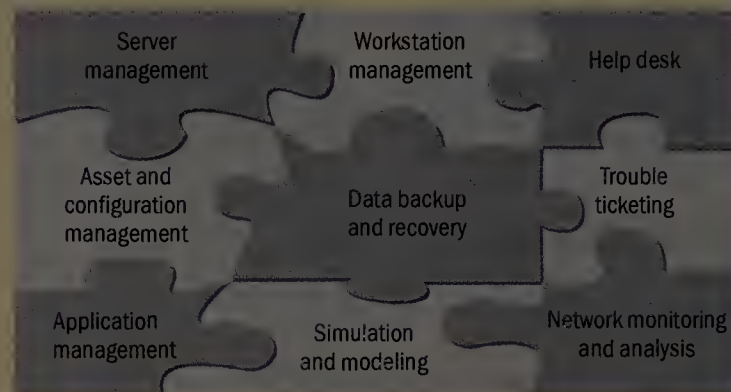
Two prerequisites for a centralized support strategy are an accurate inventory of the LAN

and gain an understanding of current practices for baseline service offerings, downtime policies and metrics, concurrent users, thresholds and management alarms. Finally, service center planners need to find out if the remote sites have any hardware and software upgrades planned.

The most effective way to gather this information is through a comprehensive, detailed survey in which both local support staff and users should participate. These groups should be questioned separately to uncover any divergent opinions.

## Putting the pieces together

Figuring out what's happening at distant sites can be difficult, but a remote LAN service center can help put the puzzle together by providing a variety of interrelated functions.



systems and a degree of standardization for the servers, desktop systems and networks, as well as the configurations, application suites, naming conventions, and even filing and directory structures.

The purpose of the information-gathering phase is to discover what and how hardware, software, network systems, desktop configurations and applications have been implemented for these LANs.

This information will help service center staffers understand the remote LAN environments they support.

Service center planners need to get a handle on the current performance and service quality levels expected by remote LAN users, as well as what services those users actually perform themselves, get help on from local support personnel or to which they simply do not have access.

In addition, they need to assess what sorts of data and application security requirements exist at the remote sites

During the information-gathering phase, net planners should come to an understanding of what remote LAN management responsibilities can be centralized, what end-user visible performance metrics need to be measured and tracked, and what changes might be necessary to the remote LAN environments.

## Requirements definition

The requirements definition phase provides the basis for determining the tools, procedures, standards and skill sets needed at the central service site. This is a critical planning and policy step: Definition of remote LAN service center requirements will strongly influence long-term costs and capabilities.

The major input for these decisions is a detailed analysis, potentially at the task level, of the service capabilities under consideration. The analysis should include an estimate of what technology can be used. It should take into account basic information such as network layouts, hardware configurations or tech-

nical skills needed to perform a service; the task frequency, scope and how it is impacted by the number of users or servers; whether a task is planned or will be triggered by an external event such as a system alert; and targeted response or completion time.

The inventory and survey conducted during the information-gathering phase may have identified environmental factors that need to be accommodated. For example, an environment comprising multiple server and client operating systems likely will need more than one tool set and support procedure.

This diversity might impact automated asset management, remote monitoring, software management and data backup systems. For example, backup systems likely will use different tools for Microsoft Corp. Windows NT, Novell, Inc. NetWare and Unix servers, although procedures and standards will be similar.

In some cases, existing systems investments might make it more practical to phase in support for some requirements rather than implement support all at once. Data backup systems, again, are a good example: Existing backup hardware might constrain choices for technologies or suppliers.

During this phase, planners should pay special attention to security requirements. Remote desktop or server diagnostic tools may create potential security holes because they allow remote access to user data. For example, while remote desktop takeover systems are critical for diagnosing usage and desktop configuration problems, they could allow access to highly sensitive or confidential files.

Firms need to formulate information security policies for access to tools, tracking actions and user notification. These policies need to be put in place especially where external contractors are used in a significant capacity.

A related activity during requirements definition is technology assessment. This process focuses on evaluating the applicability of standards, such as Simple Network Management Protocol, Remote Monitoring or Desktop Management Initiative, to the tasks identified.

Depending on this evaluation, these standards may become requirements or may be used to determine the compati-

bility of a vendor's direction with your plans.

In thinking about requirements, planners also must consider the flexibility of and potential changes in the tools the environments being supported and the IT operational model. Evaluating what-if scenarios can help planners understand these dimensions.

What would happen, for example, if your Intel Corp. based desktops migrate from Windows 3.1 to Windows 95, to NT, to OS/2? Or what if a selected vendor fails to keep abreast of your needs as well as competing vendors do? Or what would happen if desktop administration was outsourced?

## Tool selection

Planners can begin identifying tool sets they will need before they finish defining requirements. Different tools likely will be needed to monitor and manage LAN hardware, software, inventory and security systems. Planners should focus on finding the best combination of products.

In addition to identifying the tool sets, planners need to evaluate how complex the procedures are for using them. Multiple tools probably need to use common information such as user and desktop profiles or problem-tracking reports, so it is desirable that they can share or store data in a common database.

Planners will have to look at a range of support products, including LAN segment monitors, router configuration tools, user account management utilities, and software distribution and installation systems. Product architecture can be an important criteria for larger networks since it can impact costs.

Some architectural factors to consider are scalability, modularity, the technology and methods used, flexibility, configuration complexity, ease of use and recovery capabilities.

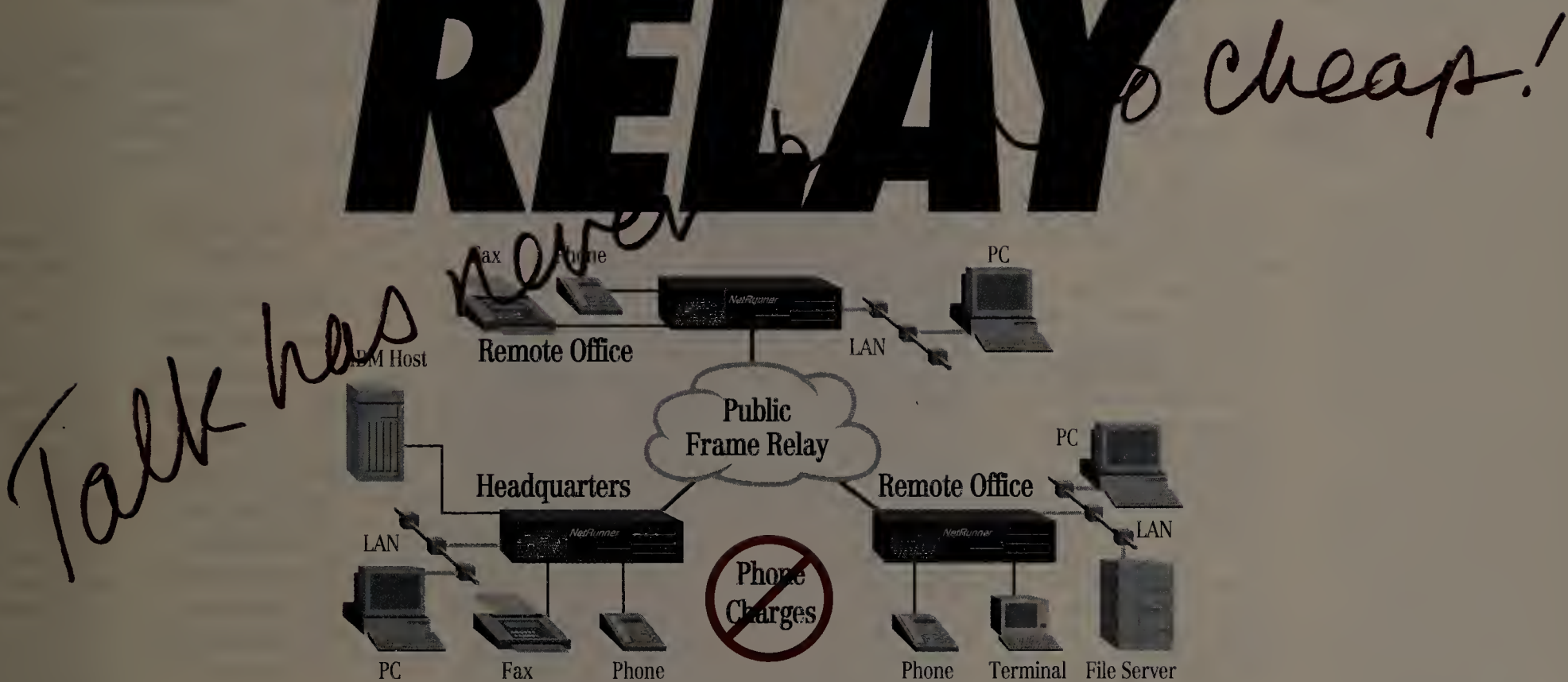
Looking at the tool set choices can make decisions seem more complex. A matrix of the necessary tasks — or at a higher level, the capabilities — and different LAN environments can help simplify and system-

atize these evaluations. Planners can use this matrix to consolidate tool requirements and evaluation criteria, as well as to list potential products or to document how these products need

See Remote LANs, page 4L



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# CompTIA-tested technicians get A+

*This quarter's look at LAN certification covers a basic computer hardware and OS test.*

By Ron Nutter

As users get their hands on the latest and greatest computer hardware and software, their desktop machines quickly become more complex than they were when taken out of the box. While these PC upgrades might make users more productive, they can present quite a challenge to network managers and other technical troubleshooters.

The Computing Technology Industry Association (CompTIA), a trade group in Lombard, Ill., has partnered with several major industry players to help solve this problem. It has developed the A+ Certification Program, which tests candidates on their core knowledge of basic computer hardware and on Microsoft Corp.'s DOS/Windows or Apple Computer, Inc.'s Macintosh operating systems.

The exams are experience-based, which means candidates cannot buy a study guide that tells them all they need to know to pass the exams. Individuals with less than two years of hands-on experience will have difficulty passing the tests.

CompTIA uses several test versions so that candidates who retake the exams do not have the chance of passing due to familiarity with the questions rather than true knowledge of the material. It would be expensive and time-consuming for someone to try to become familiar with all the questions on the tests.

And perhaps more importantly, the tests are concerned not only with technical competence, but also with customer skills. This reflects the growing importance of people skills.

The trek to A+ certification begins by calling Drake Prometric, the test provider and administrator, at (800) 776-4276. Test candidates can find out information such as what kinds of questions appear on the exams.

The hardware and operating system tests together cost \$165. Candidates who do not take both exams on the same day must complete the remaining test within 90 days of the date the first test was passed. If certification is desired for DOS/Windows and Macintosh environments, candidates can take the remaining operating system test at any time.

After passing the required exams, test takers receive a certifi-

cate for framing and an identification card that verifies the accomplishment. Employers and others can check the ID number to make sure the certification is not fraudulent.

CompTIA also recognizes service providers that commit to having at least half of their technical staff A+ certified. It awards them the designation A+ Certified Service Center, which provides some assurance that the service provider is striving to employ the best technical talent possible.

To help firms find A+ Certified Service Centers, CompTIA offers a national listing of providers that have fulfilled the requirements. It updates the listing periodically.

## Helping hands

Although CompTIA does not publish a study guide, several companies do offer study help. Wave Technologies International, Inc. in St. Louis has an independent study course and classroom training. The firm, which can be reached at (800) 828-2050, also offers the A+ Challenge,

a question pool that covers material that represents what could appear on the exam.

The price of the independent-study course is \$595, and the question pool is \$99.

Candidates may contact Wave Technologies, which is known for its quality Certified Novell Engineer and Microsoft Certified System Engineer training materials, for current pricing on the classroom instruction.

IBM Education, which can be reached at (800) 426-8322, Ext. 999, offers a bundle of study materials that can be found in most bookstores. The package includes a videotape and study guide that references specific pages in the accompanying books.

The videotape covers basic laser printer operation, has a good primer on electrostatic discharge and provides general background information. The bundle costs \$379.95.

Self-Test Software, Inc. in Norcross, Ga., offers an economically priced question pool that covers each of the three exams. A single-user license for the core exam plus the DOS/Windows elective is \$79.

When candidates miss a question, they are provided with ref-

erences that will explain the subject matter. The user can adjust the number of questions presented in a given category to keep from being overwhelmed when first reviewing the question pool or to help tailor the quizzing to certain areas. Self-Test Software may be reached at (404) 641-9878.

As companies try to do more self-servicing, it becomes important to have a benchmark to compare against to see if prospective employees really understand computer technology.

Resellers also are using the A+ certification as an entry point to employment. They make sure potential employees have passed the tests or require that they do so within a given period of time

## Study buddies for CompTIA A+ certification

Several companies offer help to LAN technicians planning to take CompTIA's certification tests.

Company	Offering	Price
Wave Technologies (800) 825-2050	Independent study course; question pool; classroom training	\$595 for the study course; \$99 for the question pool; call for classroom pricing
IBM Education (800) 426-8322, Ext. 999	Study package, which includes a videotape and study guide	About \$380
Self-Test Software (404) 641-9878	Question pool	\$79 for a single-user license for the core exam plus the DOS/Windows elective

after starting work.

OEMs such as Compaq Computer Corp. and Epson America, Inc. require technicians to be A+ certified before they can attend a training class required for warranty service repairs. CompTIA said many individuals take the exams at their own expense in an effort to distinguish themselves from others in their department or from competition when apply-

ing for a job.

If your company is negotiating with an OEM to be a self-maintainer — an end-user company that performs its own warranty repairs — it will be easier to obtain that status if your technical talent has passed the A+ tests.

*Nutter is a contributing editor at Network World.*

## Remote LANs

*Continued from page 2L*

to work together.

During the tool selection process, it is advantageous to plan for and engage vendors to participate in one or more pilot implementations. These serve a number of purposes. They can:

- Confirm tool capabilities.
- Find operational problems.
- Determine which procedures are best for implementation.
- Validate cost and economic models.

Also during this phase, planners should begin work on the financial model for implementing and operating the centralized service center. They can ascertain preliminary estimates for equipment, staffing, space and connectivity costs.

Using information from site surveys, planners can estimate cost savings — each service capability provided through the central operations center should have identifiable cost savings. But current cost data may be hard to obtain since the cost of supporting a LAN and workstations often is not well understood. To help, estimate before and after costs in several ways. Then use the estimations to determine cost numbers.

## Implementation planning

As the tool sets are selected, implementation planning can begin. That planning involves the staging and the processes surrounding the operation of a central support function.

As mentioned in the information-gathering stage, a detailed

inventory of installed systems is necessary. Rollout should be planned on a per-site basis. The first sites to go on-line verify the rollout procedures, so planners should build a cushion into the schedule. Follow-up evaluations also are recommended.

During the planning stage, the interaction between the central support group and help desk needs to be detailed. If a centralized help desk does not exist, then providing one should be a priority. It is through the help desk that users gain their perception of how valuable the service center is and what level quality of service it provides.

If a help desk already is in place, planners must coordinate user service requests with central support and database information.

Other issues in implementation planning are the physical design of the support center and the network connectivity necessary for the functions provided. The staffing plan will need to accommodate extended coverage, a scale of technical expertise and training.

The procedures used to provide support functions will entail long-term investment. Procedures are critical as they help with consistency of services provided as well as training and staffing. They must be detailed enough to be consistently fol-

lowed and auditable, as well as allow for quality measurements.

## Implementation

As the actual implementation begins, the project is at its most fragile stage. First, you likely have approached this as a special project, but the systems, operations and organization you put in place must now function in a business-as-usual manner. For this reason, you need to closely track the success of the organization as it moves into implementation.

Second, it is at this point that developing and maintaining user support is most critical since users will begin to see changes in how their needs are met. Inform users about what services the central site will provide, and on an ongoing

basis, plan to provide information on service quality metrics, service level commitments and any other new capabilities.

Implementing centralized management for your LANs is an extended, complex task. But given the rapidly changing LAN environment and increasing user expectations, it is probably the only strategy for meeting business expectations.

*Cullen is principal consultant at Onsett International Corp. He can be reached at (617) 577-9130.*

## TO CENTRALIZE OR NOT

**Companies that have around 1,000 remote LAN users ought to think about setting up a centralized management center. They should expect to initially pay between \$600 and \$1,200 per seat, Onsett International estimates.**











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## Win95

*Continued from 1L*

"For sites with 200 nodes or more whose users want peer networking, central IS no longer has the administrative nightmare of users forgetting their passwords or leaving their password wide open to everybody. It gives them central control of the database of names without having to visit every machine," he said.

Not everyone is as optimistic about the new feature. According to Computer Intelligence's Schatt, user-level security is actually more of a hassle for central IS.

"It's one more thing that it has to manage," Schatt said. "It is going to have to manage what people should be able to access, what they should not be able to access and so forth. So it kind of creates a nightmare."

Still, Windows 95 offers the opportunity for user-level security, whereas other peer networking products, such as Artisoft's LANtastic and Novell, Inc.'s Personal NetWare, only provide for share-level security.

**Over the 'Net**

A third key feature of Windows 95 is that it enables peer networking via TCP/IP.

"You can use NETBEUI and IPX, which you could do in Windows for Workgroups, but now you can also share using TCP/IP, which is growing in popularity in a lot of large corporations for WAN connectivity," Microsoft's Bennett said. Since TCP/IP is the protocol of choice over the Internet, peers can share resources via that medium, he added.

A big factor for users that want the peer networking capability found in Windows 95 is ease of installation, according to Bennett. Windows 95's plug-and-play feature lets it automatically discover and configure itself for any attached network hardware.

"You can take a network card that you bought from wherever, put it in your machine, turn it on and have Windows 95 recognize it and configure the interrupts and the I/O settings," Bennett said. "That makes installation much easier."

Users concurred. "I just finished getting the sixth node up [on the Windows 95 peer network]," said Innovasive's Brynild. "I found this to be extremely easy."

Previously, the department had used a combination of Windows and Personal NetWare for peer file sharing.

"I fought tooth and nail trying to get the Windows and Personal NetWare software up and running, and it took me a couple of weeks to tweak it and be able to use it the way I wanted to use it," Brynild said. "It took maybe an hour or two to install Windows 95 and have it up on a network, and that includes the time just to put the network card in and do the cables."

**The cost factor**

Users and analysts said cost is a big factor for firms that want to upgrade to Windows 95 from something like Windows for Workgroups, but Microsoft begs to differ.

"The upgrade to Windows 95 for cur-

rent Windows for Workgroups users is not going to be a huge cost," Bennett said. "Windows 95 runs on a 386 with 4M bytes of memory, and we recommend 8M, but we think that most corporations have that configuration if they're doing peer networking stuff."

"That's simply not true," Schatt disagreed.

Technically, Windows 95 will work on a 386 with 4M bytes of memory, Schatt said.

"But you wouldn't be able to run your business applications using it," he said.

And even if a firm doesn't need to upgrade computer processors and memory, it will find substantial cost associated with a software-only upgrade to Windows 95, according to recent estimates from Gartner Group, Inc. in Stamford, Conn. According to the research firm, the per-user cost for the Windows 95 upgrade can be as high as \$1,465 (see graphic, page 1L).

Users don't seem phased by this.

"I'm putting this on 486 33-MHz PCs, but we had them in place here already," Brynild said. "We didn't have to buy any new hardware, just new network cards and cable, and the software upgrade was minimal. My boss said, 'Hey, if you can do it that cheaply, go ahead.'"

*Cummings is a freelance writer in Marlborough, Mass.*

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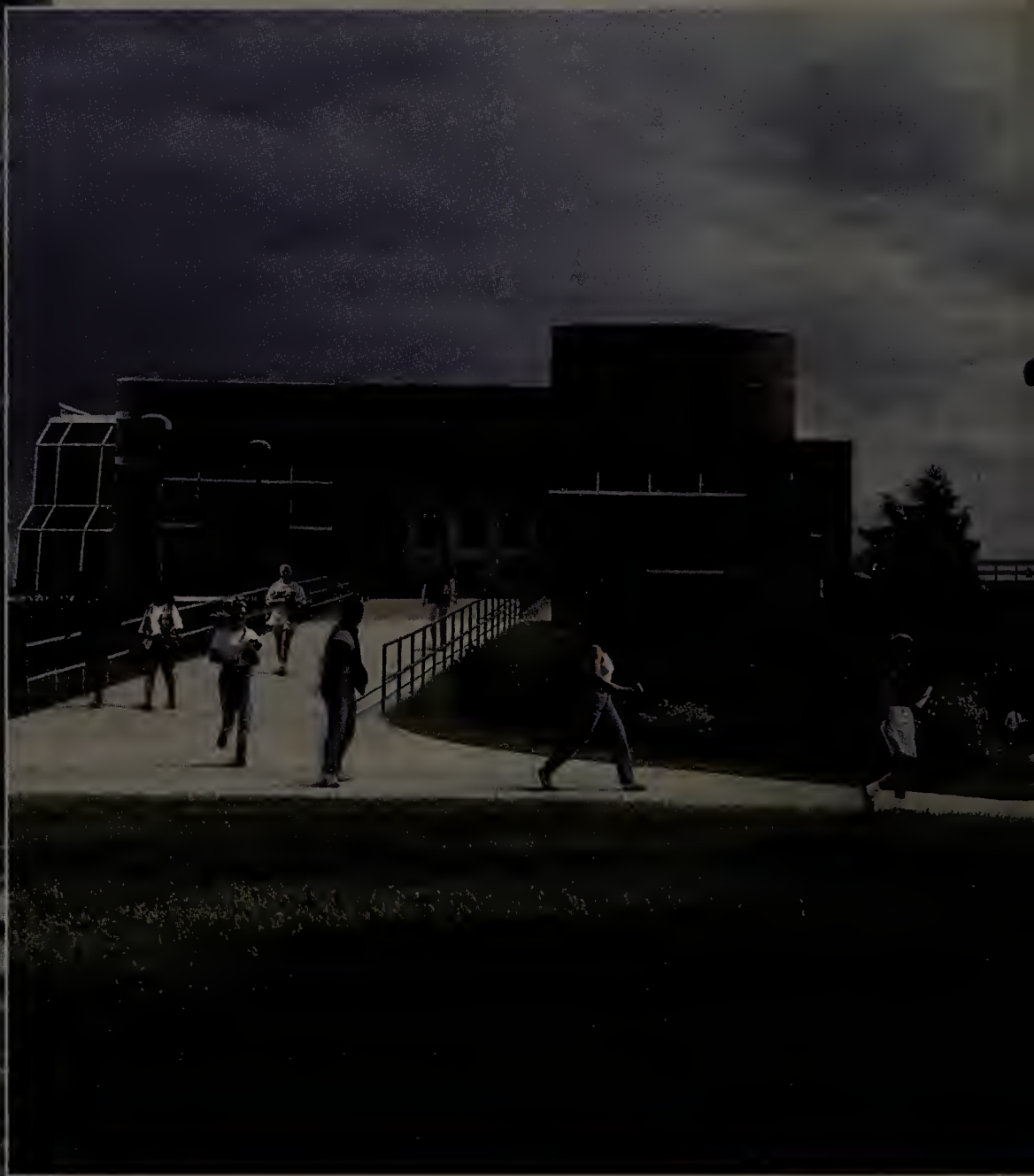
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## Hitachi offers OEM version of RS/6000

By Joanne Cummings

Santa Clara, Calif.

Hitachi Data Systems announced the availability of HDS SR4300 Scalable RISC Complex — an OEM version of IBM's RS/6000 SP — and three software modules designed to help firms take advantage of the box's parallel processing capabilities.

"Hitachi will differentiate itself in the software it offers and in the ways it grows the platform," said Richard Partridge, research analyst at D.H. Brown Associates, Inc., a research firm in Port Chester, N.Y.

The HDS SR4300 is a high-performance server based on IBM's Power2 chip architecture that runs AIX, the firm's version of Unix. It comes in configurations of two to 128 processors, depending on an organization's processing requirements.

Users can add processors as their needs change, said Bob McGaughey, director of product marketing at Hitachi.

Hitachi sees most users deploying the server for data-intensive applications such as on-line transaction processing (OLTP), decision support and data mining. McGaughey also said large organizations can use the product to centralize several distributed servers into one machine and one location. "This will enable them to get the price/performance they need, but [also get] the glass house-type of security, integrity and availability," he said.

### Software plus

The first of the three software modules Hitachi is developing for the SR4300 is an OLTP monitor that takes advantage of the machine's parallel processing architecture to maintain sustained transaction performance, McGaughey said. The software, called OpenTP1, also protects against the loss of transaction data caused by a system failure occurring anywhere on a distributed OLTP network.

The second software module is a database application, called Transbatch, that allows massive amounts of data from many files to be transported to groups of processors within the SR4300. Data keys located within each record are used to route portions of the data to selected processor groups for subsequent processing. Since this process is performed in parallel for every processor group, it lets very large quantities of data be transported and processed within the SR4300, McGaugheysaid.

The third module, called Job Management Partner 1, lets users distribute portions of a batch processing job across various network resources, and schedule them at various times.

None of the software modules have been priced yet, but all are expected to be available in the first quarter of 1996.

The SR4300 is currently available and priced depending on configuration. A base-level model configured with six processors, AIX and three standard applications costs approximately \$500,000, McGaugheysaid.

©Hitachi: (408) 970-4356.

## Unix software protects against data loss because of disasters

By Joanne Cummings

Cambridge, Mass.

CLAM Associates announced a group of Unix software modules that let users access critical applications despite system failure or actual site loss.

The software, which is called Geographic High Availability (GeoHA) lets application servers that have been configured into a compute cluster be placed in widely separated geographic locations. Each server has an identical but separate image of the application and data. In the event of a disaster, the software automatically switches the applications, data and users to another location in just minutes, the firm said.

GeoHA runs on any AIX-based IBM RISC System/6000 workstation or server.

The software has three components. The first, GeoMessenger, provides communications between the computers in the distributed cluster. It transmits a

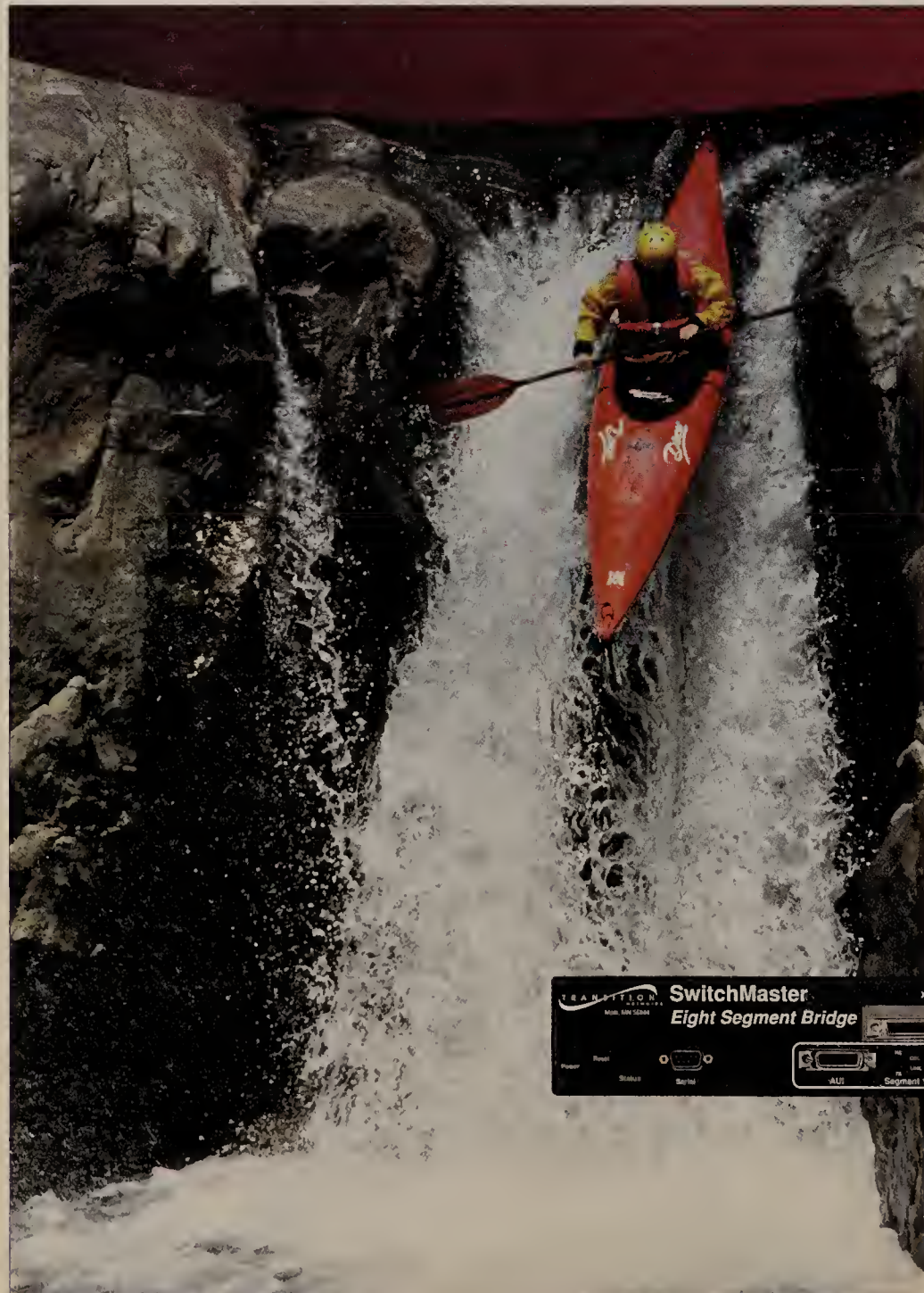
"heartbeat" signal between all locations, ensuring the servers at each site are running properly.

GeoManager acts as a supervisor for the distributed cluster, monitoring the heartbeat that GeoMessenger sends out to determine the status of each location. When it senses a problem, it automatically switches all of the data to the most available computer in the cluster — in most cases, within minutes of a failure, the company said.

GeoMirror works on top of the operating system logical volume disk manager, and replicates and coordinates data updates at each location, assuring that the sites are synchronized.

Available now, GeoHA is priced depending on the number of sites and computers. A four-node cluster in two separate locations with the associated planning and implementation services, costs \$150,000.

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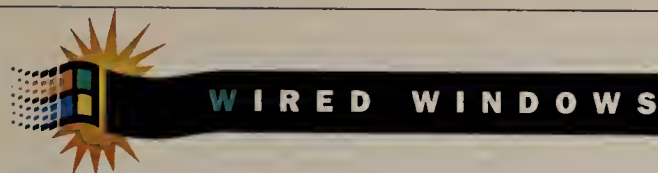
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# Making the Win95-to-NetWare connection

By Dave Kearns

**A**ll right, you can no longer put off users clamoring for Windows 95 on their desktops. They're running it at home and want it in the office. Even worse, the user who wants it most happens to be your boss.

Maybe it's time you took another look at the Windows 95 Migration Kit.

One thing you'll discover early on is that you have choices for connecting Windows 95 desktops to NetWare LANs. In fact, there are five client software suites from which to choose — two from Microsoft Corp. and three from Novell, Inc.

Unfortunately, no one client will give you all of the combined functionality of Windows 95 and NetWare 3.X and 4.X.

If you have NetWare, you're probably already using one of Novell's Windows 95-to-NetWare options: the NETX shell from NetWare 3.11 or earlier, or the Virtual Loadable Module redirector from NetWare 3.12 or 4.X. But these tools will not let you use Microsoft's Long File Names or its File and Print Services for NetWare.

With users complaining that they want protected-mode drivers that support NetWare Directory Services (NDS) logons, Novell also has released a beta version of new client software called Client32 for Windows 95.

Microsoft, too, has developed an NDS client for NetWare.

In addition, Windows 95 comes with the Microsoft client for NetWare networks, which supports Long File Names as well as File and Print Services. But it does not have support for NDS and has limited support for NetWare logon scripts.

Over the next few weeks, we'll take a closer look at various client suites in an attempt to help you sort out which you'll need for your network — or simply as an exercise in convoluted logic.

While you're waiting, get together a short list of your network's components and the functionality you want or need from the Windows 95 workstations. Among the items to collect:

- Server versions.
- Topologies and protocols used, including frame types as well as stack types, such as ODI and NDIS, and vendors.
- NetWare workstation utilities used, such as Rprinter, Rconsole, Syscon, NWUser and NWAdmin.
- Windows 95 peer services used, such as file and print services, and any dial-up services you wish to use, either Windows 95-based or NetWare-based.

You also will want to review logon scripts and NET.CFG files, and be familiar with the options you're using in them. Each of these will play a part in deciding which client to use.

Additionally, you'll want to know the amount of RAM in the prospective Windows 95 client, as well as the applications that normally run on that client — at least in terms of DOS vs. Windows 3.X vs. Win-

dows 95 applications.

Next week, we'll zoom in on Microsoft's offerings — its client for NetWare networks, which comes with Windows 95, and its NDS client for NetWare 4.X net-

works, available as a self-extracting archive (MSNDS.EXE) on Microsoft's File Transfer Protocol and World-Wide Web servers, CompuServe's WINCON forum and many other sites.

## Tip of the week

No matter which client you end up using, before connecting the first Windows 95 client, be sure your server's net card drivers are up-to-date and NetWare 4.X-compatible.

*Kearns was formerly a network administrator and now is a freelance writer and consultant in Austin, Texas. He can be reached at [kearns@msn.com](mailto:kearns@msn.com).*

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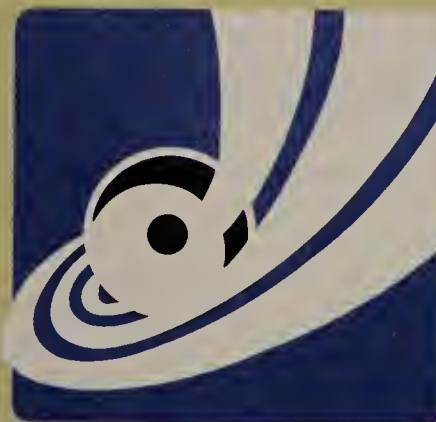
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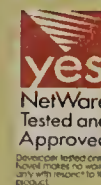
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## NET RESULTS

## Cabletron finally pulls the trigger



Skip MacAskill and Melinda Le Baron

**W**ell, well, well. So, how does humble pie taste anyway?

An appropriate question for our Cabletron Systems, Inc. friends up in Rochester, N.H., who just announced their intent to purchase Standard Microsystems Corp.'s (SMC) Enterprise Networks business unit, which is

responsible for SMC's entire line of LAN switching products.

Cabletron, you'll remember, is the firm that kept chuckling to itself when virtually all its competitors got caught up in the networking industry's merger and acquisition frenzy. While firms such as Bay Networks, Inc. and Cisco Systems, Inc. were

making one acquisition after another, Cabletron sat back and told the world it didn't have to pursue that course of action because it had everything covered through internal development programs.

Well, it appears the fast Ethernet market was growing a bit faster than Cabletron expected. Faced with increasing interest from its customer base and realizing it may not be able to meet initial demand through internal development, Cabletron did the right thing by taking out its wallet and plunking down some money.

As the company wipes the egg off its face, let's look at this deal a little closer. Overall, it's a positive move for both Cabletron and its customers. For relatively short money — around \$78 million — Cabletron gets some needed technology and becomes a viable player in the fledgling fast Ethernet market.

But there are several potential pitfalls.

■ First, since Cabletron has absolutely no experience in this acquisition game, it remains to be seen whether it can effectively manage this purchase and assimilate SMC products and personnel into corporate Cabletron.

■ Second, while Cabletron gains a workgroup-based line of Ethernet switches and fast Ethernet devices in SMC's TigerSwitch offerings, it doesn't have the distribution channels in place to really drive the product line once the low-end market matures for these types of products over the next nine to 18 months. Cabletron's philosophy has always been direct sales, and while that will allow them to push the TigerSwitch line initially, it's not the best long-term approach.

■ Third, Cabletron has to decide what to do with the EliteSwitch/1 (ES/1), SMC's flagship switching hub that has a significant installed base. There are serious overlap issues with Cabletron's chassis-based devices — the SmartSwitch and MMAC-Plus — that must be addressed.

■ The people at most risk here, unfortunately, are existing ES/1 users. Until Cabletron articulates the future of this platform, continued investment in it is probably not a good idea. It will be interesting to see, however, if Cabletron can leverage ES/1's integrated routing technology — a capability Cabletron is sorely missing.

■ Fourth, like others that have acquired, Cabletron faces some daunting network management integration issues. Since Cabletron maintains an enterprise management platform in Spectrum and a couple element management packages, these integration issues will be compounded.

■ Finally, this move is yet another blow to the hopes for 100VG-AnyLAN. That technology has now seen its two biggest supporters beyond Hewlett-Packard Co. — Cisco and Cabletron — make significant financial investments in the competing 100Base-T technology. That cannot be good news over at HP.

*Le Baron is a research director and MacAskill a senior research analyst in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached by E-mail at inquiry@gartner.com or by phone at (203) 316-1111.*

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Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Business phone (\_\_\_\_\_) \_\_\_\_\_

Business FAX (\_\_\_\_\_) \_\_\_\_\_

Internet address \_\_\_\_\_

## 1 Industry: (check one only)

- |   |  |
|---|--|
| 01. <input type="checkbox"/> Manufacturers (other)  | 12. <input type="checkbox"/> Government (Federal/State/Local)                                  |
| 02. <input type="checkbox"/> Finance/Banking  | 13. <input type="checkbox"/> Military  |
| 03. <input type="checkbox"/> Insurance/Real Estate/Legal  | 14. <input type="checkbox"/> Aerospace   |
| 04. <input type="checkbox"/> Health Care Services   | 15. <input type="checkbox"/> Consultants (Independent)   |
| 05. <input type="checkbox"/> Hospitality/Entertainment/Recreation   | 16. <input type="checkbox"/> Carriers/Interconnects  |
| 06. <input type="checkbox"/> Media/TV/Cable/Radio/Print   | 17. <input type="checkbox"/> Manufacturers (Computer/Communications)                           |
| 07. <input type="checkbox"/> Retail/Wholesale Trade/Business Services   | 18. <input type="checkbox"/> Resellers of Computer/Network Products (VARs, VADs, Distributors) |
| 08. <input type="checkbox"/> Transportation   | 19. <input type="checkbox"/> Systems/Network Integrators                                       |
| 09. <input type="checkbox"/> Utilities  | 20. <input type="checkbox"/> Distributors (Computer/Communications)                            |
| 10. <input type="checkbox"/> Education  | 21. <input type="checkbox"/> Other (please specify) _____                                      |
| 11. <input type="checkbox"/> Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry) |  |

## 2 What is your job function? (check one only)

NETWORK IS MANAGEMENT:

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Networking Management           | 6. <input type="checkbox"/> Corporate Management (CIO, CEO, Pres., VP, Dir., Mgr., Financial Management) |
| 2. <input type="checkbox"/> LAN Management                  | 7. <input type="checkbox"/> Consultant (Independent)   |
| 3. <input type="checkbox"/> Datacom/Telecom Management      | 8. <input type="checkbox"/> Other (please specify) _____   |
| 4. <input type="checkbox"/> IS, IT, MIS, Systems Management |  |
| 5. <input type="checkbox"/> Engineering Management          |  |

## 3 What is the total number of sites for which you have purchase influence? (check one only)

- |                                     |                                     |                                   |                                  |
|-------------------------------------|-------------------------------------|-----------------------------------|----------------------------------|
| 1. <input type="checkbox"/> 100+    | 3. <input type="checkbox"/> 20 - 49 | 5. <input type="checkbox"/> 2 - 9 | 7. <input type="checkbox"/> None |
| 2. <input type="checkbox"/> 50 - 99 | 4. <input type="checkbox"/> 10 - 19 | 6. <input type="checkbox"/> 1     |                                  |

## 4 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE (check one only)

1. ☐ Corporate/Enterprise  
2. ☐ Department  
3. ☐ None

B. INVOLVEMENT (check all that apply)

1. ☐ Recommend/Specify  
2. ☐ Approve  
3. ☐ Evaluate  
4. ☐ Determine the need  
5. ☐ None

## 5 Check ALL that apply in Columns A and B:

A. I am involved in the purchase of the following products/services:

B. I plan to purchase the following products/services:

- A 100 B LOCAL-AREA NETWORKS**
01. ☐ Local-Area Networks  
02. ☐ Network Op. Sys. Software  
03. ☐ LAN Storage/Backup  
04. ☐ Optical LAN Storage/Backup  
05. ☐ Disk LAN Storage/Backup  
06. ☐ Tape LAN Storage/Backup  
07. ☐ RAID LAN Storage/Backup  
08. ☐ Network Test/Diagnostic Tools  
09. ☐ Cables, Connectors, Baluns  
10. ☐ UPS  
11. ☐ Network Interface Cards  
12. ☐ Peer-to-Peer LANs  
13. ☐ SNMP Network Management  
14. ☐ ATM Switches  
15. ☐ Token-Ring Switches  
16. ☐ Ethernet Switches  
17. ☐ Remote LAN Access/Communications Servers  
18. ☐ Superservers  
19. ☐ File/Application Servers  
20. ☐ Print Servers

- A 101 B INTERNETWORKING**
21. ☐ Bridges  
22. ☐ Routers  
23. ☐ Bridge/Router  
24. ☐ Gateways  
25. ☐ Intelligent Hubs/Stackables

- A 102 B COMPUTERS/PERIPHERALS**
26. ☐ Laptops/Notebooks/Sub-Notebooks  
27. ☐ Micros/PCs  
28. ☐ Minis  
29. ☐ Mainframes  
30. ☐ Workstations  
31. ☐ Terminals  
32. ☐ Printers  
33. ☐ Cluster Controllers  
34. ☐ Monitors  
35. ☐ Fax/Modem Boards

- A 103 B REMOTE/WIRELESS COMPUTING**
36. ☐ PDAs  
37. ☐ PCMCIA Devices  
38. ☐ Wireless Data Services  
39. ☐ Wireless Data Equipment  
40. ☐ Wireless LANs  
41. ☐ Cellular Equipment & Services

- A 104 B INTERNET/ELECTRONIC COMMERCE**
42. ☐ Internet Access Providers  
43. ☐ Firewalls  
44. ☐ Web Servers/Browsers  
45. ☐ Internet Software Tools

- A 105 B SOFTWARE/APPLICATIONS**
46. ☐ Network Management  
47. ☐ Systems Management  
48. ☐ Security  
49. ☐ Communications Software  
50. ☐ Terminal Emulation  
51. ☐ Word Processing  
52. ☐ Operating Systems  
53. ☐ Client/Server Applications Development  
54. ☐ Database Management/RDBMS  
55. ☐ Spreadsheet  
56. ☐ Groupware  
57. ☐ EDI  
58. ☐ E-mail  
59. ☐ Windows/Graphical User Interface  
60. ☐ Multimedia  
61. ☐ Graphics/DTP  
62. ☐ Remote Access  
63. ☐ Imaging  
64. ☐ Suites  
65. ☐ Middleware  
66. ☐ Document Management  
67. ☐ Database Server  
68. ☐ Site Metering Tools  
69. ☐ Computer-Integrated Telephony (CIT)

- A 106 B WIDE-AREA NETWORK EQUIPMENT & SERVICES**
70. ☐ Frame Relay Equip./Services  
71. ☐ Modems  
72. ☐ FT-1/T-1/T-3 Multiplexers  
73. ☐ FT-1/T-1/T-3 Services  
74. ☐ SONET  
75. ☐ Inverse Multiplexers  
76. ☐ SMDS  
77. ☐ Asynchronous Transfer Mode  
78. ☐ Diagnostic/Test Equipment  
79. ☐ DSU/CSU  
80. ☐ VSAT/Satellite  
81. ☐ ISDN Equipment & Services  
82. ☐ PBXs  
83. ☐ Voice Mail/Response  
84. ☐ Videoconferencing  
85. ☐ Leased Lines  
86. ☐ Switched Data  
87. ☐ E-mail/On-line Services  
88. ☐ 800/900/MTS Services  
89. ☐ Virtual Networks  
90. ☐ Outsourcing/Systems Integration Services  
91. ☐ Education/Training Services

92. ☐ None of the above (1-91)

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9501

## 6 What is the total number of LANs, workstations/nodes at this location/ in your organization?

- | At this location:                         | Workstations/<br>Nodes   | Entire organization:                      | Workstations/<br>Nodes   |
|---|--------------------------|---|--------------------------|
| LANs                                      |                          | LANs                                      |                          |
| 1. <input type="checkbox"/> 5,000+        | <input type="checkbox"/> | 1. <input type="checkbox"/> 5,000+        | <input type="checkbox"/> |
| 2. <input type="checkbox"/> 1,000 - 4,999 | <input type="checkbox"/> | 2. <input type="checkbox"/> 1,000 - 4,999 | <input type="checkbox"/> |
| 3. <input type="checkbox"/> 100 - 999     | <input type="checkbox"/> | 3. <input type="checkbox"/> 100 - 999     | <input type="checkbox"/> |
| 4. <input type="checkbox"/> 50 - 99       | <input type="checkbox"/> | 4. <input type="checkbox"/> 50 - 99       | <input type="checkbox"/> |
| 5. <input type="checkbox"/> 10 - 49       | <input type="checkbox"/> | 5. <input type="checkbox"/> 10 - 49       | <input type="checkbox"/> |
| 6. <input type="checkbox"/> 1 - 9         | <input type="checkbox"/> | 6. <input type="checkbox"/> 1 - 9         | <input type="checkbox"/> |

## 7 Check ALL that apply in Columns A and B:

A. The following network platforms are currently installed:

B. The following network platforms are planned for purchase:

- |   |   |
|---|---|
| <b>A 55 B NETWORK ARCHITECTURES</b>                       | <b>A 57 B LAN ENVIRONMENT</b>                             |
| 01. <input type="checkbox"/> SNA                          | 22. <input type="checkbox"/> 4M Token Ring                |
| 02. <input type="checkbox"/> DECnet                       | 23. <input type="checkbox"/> 16M Token Ring               |
| 03. <input type="checkbox"/> TCP/IP                       | 24. <input type="checkbox"/> Ethernet                     |
| 04. <input type="checkbox"/> Novell IPX/SPX               | 25. <input type="checkbox"/> 100M Ethernet                |
| 05. <input type="checkbox"/> APPC/APPN/LU 6.2             | 26. <input type="checkbox"/> StarLAN                      |
| 06. <input type="checkbox"/> NETBIOS                      | 27. <input type="checkbox"/> FDDI                         |
| 07. <input type="checkbox"/> AppleTalk                    | 28. <input type="checkbox"/> LocalTalk                    |
| 08. <input type="checkbox"/> NFS                          | 29. <input type="checkbox"/> 10Base-T                     |
| 09. <input type="checkbox"/> Other (please specify) _____ | 30. <input type="checkbox"/> ATM                          |
|   | 31. <input type="checkbox"/> Other (please specify) _____ |
| <b>A 56 B NETWORK OPERATING SYSTEM</b>                    | <b>A 58 B COMPUTER OPERATING SYSTEM</b>                   |
| 10. <input type="checkbox"/> Microsoft (LAN Manager)      | 32. <input type="checkbox"/> DOS                          |
| 11. <input type="checkbox"/> Novell (NetWare 2.X, 3.X)    | 33. <input type="checkbox"/> Unix/Xenix/AIX               |
| 12. <input type="checkbox"/> Novell (NetWare 4.X)         | 34. <input type="checkbox"/> OS/2                         |
| 13. <input type="checkbox"/> Windows NT                   | 35. <input type="checkbox"/> OS/2 Warp                    |
| 14. <input type="checkbox"/> Windows NT/Advanced Server   | 36. <input type="checkbox"/> IBM MVS                      |
| 15. <input type="checkbox"/> LocalTalk (AppleTalk)        | 37. <input type="checkbox"/> IBM VM                       |
| 16. <input type="checkbox"/> Banyan (VINES)               | 38. <input type="checkbox"/> Digital VMS                  |
| 17. <input type="checkbox"/> IBM (LAN Server)             | 39. <input type="checkbox"/> Macintosh                    |
| 18. <input type="checkbox"/> IBM (PC LAN Program)         | 40. <input type="checkbox"/> Windows                      |
| 19. <input type="checkbox"/> Artisoft (LANtastic)         | 41. <input type="checkbox"/> Windows 95                   |
| 20. <input type="checkbox"/> Digital (Pathworks)          | 42. <input type="checkbox"/> X Window System              |
| 21. <input type="checkbox"/> Other (please specify) _____ | 43. <input type="checkbox"/> Solaris                      |
|   | 44. <input type="checkbox"/> Other (please specify) _____ |
|   | 45. <input type="checkbox"/> None of the above (1-44)     |

## 8 For which areas outside of North America do you have purchase influence? (check all that apply)

- |                                    |   |   |
|------------------------------------|---|---|
| 1. <input type="checkbox"/> Europe | 3. <input type="checkbox"/> South America | 5. <input type="checkbox"/> Middle East |
| 2. <input type="checkbox"/> Asia   | 4. <input type="checkbox"/> Australia     | 6. <input type="checkbox"/> None        |

## 9 Do you have or plan to install client/server networks? ☐ Yes ☐ No

## 10 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

- | Mainframes                          |                          | Minis                                    |                          |
|-------------------------------------|--------------------------|--|--------------------------|
| A - Installed                       | B - Planned              | C - Installed                            | D - Planned              |
| 1. <input type="checkbox"/> IBM     | <input type="checkbox"/> | 1. <input type="checkbox"/> IBM          | <input type="checkbox"/> |
| 2. <input type="checkbox"/> Amdahl  | <input type="checkbox"/> | 2. <input type="checkbox"/> Digital      | <input type="checkbox"/> |
| 3. <input type="checkbox"/> Cray    | <input type="checkbox"/> | 3. <input type="checkbox"/> Tandem       | <input type="checkbox"/> |
| 4. <input type="checkbox"/> Hitachi | <input type="checkbox"/> | 4. <input type="checkbox"/> Unisys       | <input type="checkbox"/> |
| 5. <input type="checkbox"/> Unisys  | <input type="checkbox"/> | 5. <input type="checkbox"/> AT&T GIS     | <input type="checkbox"/> |
|                                     |                          | 6. <input type="checkbox"/> HP           | <input type="checkbox"/> |
|                                     |                          | 7. <input type="checkbox"/> Data General | <input type="checkbox"/> |

Which of the following do you have installed/planned: (USE NUMBERS ONLY)

	At this location:		Entire organization:	
	E - Servers	F - Clients/Nodes	G - Servers	H - Clients/Nodes
1. Power PC				
2. Power Macintosh				
3. Macintosh (Other)				
4. Pentium-based				
5. 80486-based				
6. 80386-based				
7. 80286-based				
8. RISC-based workstations				
9. Other				

## 11 What is the estimated value of networking equipment and services that you help specify, recommend or approve annually? (check one only)

- |  |  |  |
|--|--|--|
| 01. <input type="checkbox"/> \$100 million or more         | 05. <input type="checkbox"/> \$10 million - \$19.9 million | 09. <input type="checkbox"/> \$250,000 - \$499,999 |
| 02. <input type="checkbox"/> \$50 million - \$99.9 million | 06. <input type="checkbox"/> \$5 million - \$9.9 million   | 10. <input type="checkbox"/> \$249,999 or less     |
| 03. <input type="checkbox"/> \$25 million - \$49.9 million | 07. <input type="checkbox"/> \$1 million - \$4.9 million   | 11. <input type="checkbox"/> None of the above     |
| 04. <input type="checkbox"/> \$20 million - \$24.9 million | 08. <input type="checkbox"/> \$500,000 - \$999,999         |  |

## 12 Estimated gross annual revenue of your entire company/institution: (check one only)

- |  |  |  |
|--|--|--|
| 1. <input type="checkbox"/> \$10 billion or more             | 4. <input type="checkbox"/> \$100 million to \$499.9 million | 7. <input type="checkbox"/> \$5 million to \$9.9 million |
| 2. <input type="checkbox"/> \$1 billion to \$9.9 billion     | 5. <input type="checkbox"/> \$50 million to \$99.9 million   | 8. <input type="checkbox"/> \$4.9 million or less        |
| 3. <input type="checkbox"/> \$500 million to \$999.9 million | 6. <input type="checkbox"/> \$10 million to \$49.9 million   | 9. <input type="checkbox"/> None of the above            |

## 13 Estimated number of employees at this location/in entire organization:

- | At this location:                         | Entire organization:                      |
|---|---|
| 1. <input type="checkbox"/> Over 10,000   | 1. <input type="checkbox"/> Over 10,000   |
| 2. <input type="checkbox"/> 5,000 - 9,999 | 2. <input type="checkbox"/> 5,000 - 9,999 |
| 3. <input type="checkbox"/> 2,500 - 4,999 | 3. <input type="checkbox"/> 2,500 - 4,999 |
| 4. <input type="checkbox"/> 1,000 - 2,499 | 4. <input type="checkbox"/> 1,000 - 2,499 |
| 5. <input type="checkbox"/> 500 - 999     | 5. <input type="checkbox"/> 500 - 999     |
| 6. <input type="checkbox"/> 499 or less   | 6. <input type="checkbox"/> 499 or less   |



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# Client/Server Applications

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## Briefs

■ **Last week, Wingra Technologies, Inc.** introduced an AIX version of its **electronic messaging switch** at the EMail World & Internet Expo in Boston. The software supports messaging and directory integration among cc:Mail, Notes, Microsoft Mail and other messaging products. *Mis-sive/AIX* initially will run on the RISC System/6000 platform and cost about \$15,000. Wingra is targeting other Unix platforms, including SunSoft, Inc.'s Solaris, for future editions of its switch. The product previously ran on Digital Equipment Corp. platforms.

Wingra: (608) 238-4454.

■ **Also at EMail World & Internet Expo, ICL Enterprises North America** announced a new version of its electronic mail application for Windows and Windows 95 users on Unix networks. *Embla 2.0* supports the Interactive Message Access Protocol, which lets end users define mailboxes that reside on a server, making such mailboxes accessible from any location by multiple end users. It also supports the **Multi-purpose Internet Mail Extensions** specification, which enables users to exchange documents, spreadsheet files and assorted multimedia files.

The software costs \$99 per user, and a lite version is available for \$49 per user. It will be available in early 1996.

ICL: (703) 648-3300.

■ **IBM** last week unveiled Version 2.2 of its **FlowMark workflow** software. The release lets developers run a single process, such as customer service, across multiple locations or networks.

The new **Service Broker** creates an active link to other third-party and custom applications. It also creates a tight link with Lotus Notes. The release will be available in February on OS/2 and AIX servers and OS/2, Windows and AIX clients.

The software is priced at \$695.  
IBM: (800) 225-5426.

## SAS redefines approach to data warehousing

*The software giant readies off-the-shelf applications.*

**By Barb Cole**

Cary, N.C.

SAS Institute, Inc., a 20-year-old software giant known best for its mainframe data analysis tools, is revamping its product line to capture a bigger piece of the lucrative data warehouse server market.

The company this summer will ship ready-to-install, client/server-based decision-support applications that are a long way from the roll-your-own statistical tools that put SAS on the map.

"In the past, we've said, 'Here

is our tool kit of 30 prewritten business objects that you can knit together.' Now we'll take areas like financial reporting and offer business applications that are 80% or 90% complete," said Randy Betancourt, data warehousing program manager at SAS.

Those applications, like the other components of the SAS System, will work with a variety of relational and nonrelational databases, he added.

The applications will also complement the recently announced Orlando release of SAS

System, a suite of software tools for application development, data management and decision support that will include several new connectivity tools and database interfaces. The company also is hard at work on several automated extraction, distribution, data scrubbing and scheduling tools.

The moves are designed to help SAS lure IS shops looking to deploy data warehouses, corporate storehouses of information that are mined with decision-support tools.

With three million users grinding away on its decision-support tools, SAS already may be the leading data warehouse product vendor, said Jim Goodnight, the company's president and a cofounder.

Betancourt said SAS will position the integrated SAS System as a complete warehousing suite and try to woo companies that currently have a patchwork of

### A PROFILE OF SAS INSTITUTE

**Based:** Cary, N.C.

**Founded:** 1976

**Employees:** 3,200

**Primary products:** The SAS System, an integrated suite of software modules for building decision-support applications.

**Installed base:** 27,956 sites; 3 million end users

**Key competitors in the data warehouse arena:** Arbor, Cognos, Oracle, Platinum Technologies

### Revenue (in millions)



GRAPHIC BY: TERRI MITCHELL

## Unify gets it together on apps mgmt.

**By John Cox**

San Jose, Calif.

Unify Corp. this week will release software and interfaces designed to let companies better manage distributed applications.

The company has modified its Vision application development tool set so applications built with the tools can issue an array of statistics and events that reveal their health.

Data such as how much memory an application is using is collected by the new Unify AppMan for Vision software and passed on software agents to either a

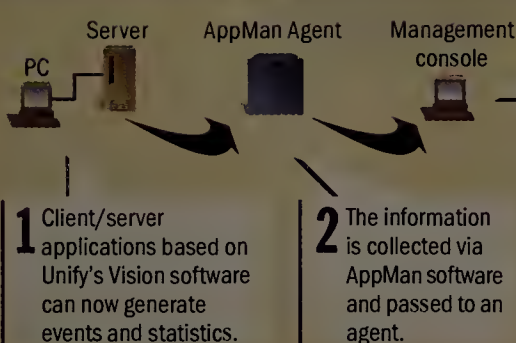
management console based on software from Unify or a third-party company. In the past, application developers had to hand-code this kind of technology.

"No one has dealt with application management issues up till now," said Melinda-Carol Ballou, senior analyst at META Group, Inc., a Stamford, Conn., market research company. "Unify is ahead of the curve in coming up with a strategy to do this. But all the [development] tool vendors will have to take a stance eventually."

There is a dizzying array of potential questions and problems that traditional network and systems management products do not cover. If a server fails, what applications are affected? Is the application meeting response time targets, and if not,

*See Unify, page 32*

### Unify's client/server management vision



GRAPHIC BY TERRI MITCHELL

### New survey says . . .

## Client/server is pricey but effective

**By John Cox**

Client/server projects are usually more costly, complex and time-consuming than expected, but they are also usually successful, according to a new report based on a survey of more than 100 customer sites.

"Too many people are evaluating whether client/server is successful from the standpoint of implementation [problems]," said Ken Dec, a vice president at market research firm Gartner Group, Inc. and a principal author of the company's "Client/server: A Study of Usage and Benefits" report. "They should be looking at the business value that client/server brings to the company over time."

Business value typically refers to benefits that are hard, if not

tools for getting operational data from networked databases into decision-support systems.

Among other things, he said the company will start pushing its own database, an English-like data language, as a data warehouse. *See SAS, page 32*

impossible, to quantify in dollars, Dec said. The Gartner Group research found the most frequently cited benefits of client/server projects to be such things as being a better fit for the company's plans and increased user productivity.

*See Survey, page 32*

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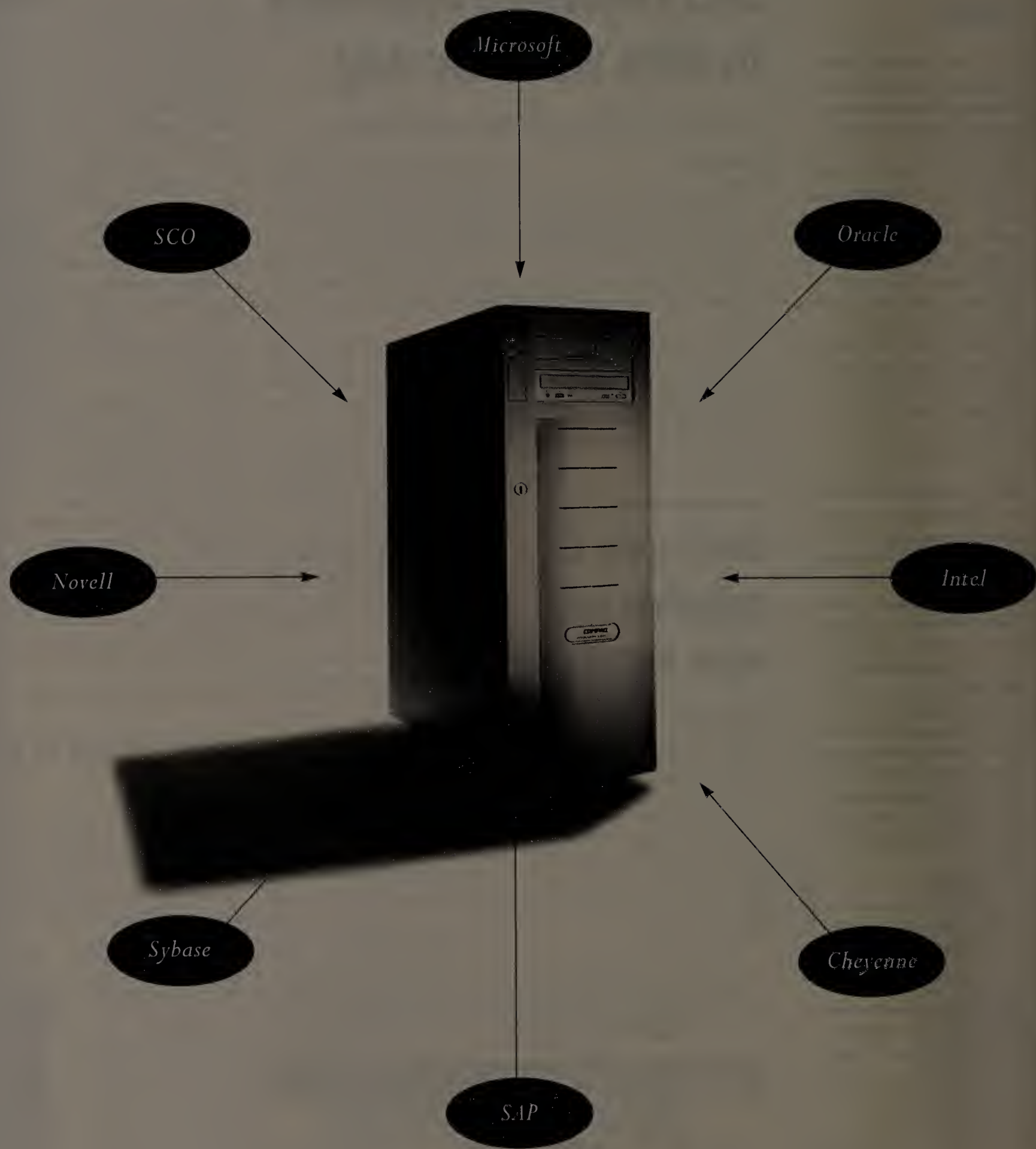
- ➔ Client/server migration case studies.
- ➔ Results of the 1995 Network World budget survey.
- ➔ A Gartner Group report comparing the networking costs of Windows, OS/2 and Macintosh platforms.
- ➔ Link to <http://www.nwfusion.com>. Select News+ then Client/Server Applications.

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## Client/Server Applications

### Survey

Continued from page 29

At the same time, no more than 7% of respondents were able to quantify a particular benefit of this type.

Supporting previous findings, the new report also found that less than 10% of respondents said client/server projects saved money by cutting the MIS hardware budget.

"We've been saying for three or four years that client/server computing will cost more than host-terminal computing because client/server is a labor-intensive model," Dec said. "But if I can make someone [such as a customer service agent] 30% or 40% more productive, then maybe it's worth the investment."

Peter Bavoso, vice president of information technologies at The Darby Group Companies, a Westbury, N.Y., medical products distributor, said those figures are in line with what he's experienced. "We went into client/server expecting things like real-time systems, downsizing, and [that] this whole thing was going to save the

company a fortune and get us off the mainframe. In our case, that didn't happen," he said.

But the payoffs have been real, he said. For example, a cumbersome manual process that took days to get important materials safety sheets out to customers now is done in minutes at a PC.

To wring the most out of the new client/server systems, especially ones considered mission-critical, users are extensively restructuring their business proce-

dures and practices, the study says. Some 40% of respondents said their client/server projects entailed major reengineering, and 53% said at least some process reengineering was involved. Major reengineering showed up at 78% of sites moving mission-critical applications to a client/server environment.

Dec predicted users will turn to a growing array of modeling and computer-aided software engineering to handle those kinds of applications in the future. ■

### Taking the measure of client/server

#### How long does it typically take to implement client/server applications?

Off-the-shelf applications: 19 months	Modified off-the-shelf applications: 18 months	Internally developed applications: 18 months
--	---	---

#### Expectation vs. reality of deploying client/server apps

Client/server project size	Percentage of respondents who said the project...		
	...took longer than expected	...cost more than expected	...was more complex than expected
Small	53	54	59
Medium	52	41	50
Large	83	50	50

Based on a survey of 117 sites.

GRAPHIC BY TERRI MITCHELL

#### Top benefits of client/server

- 1 Better fit for organizational plans
- 2 Allows integration of multiple processes on the desktop
- 3 Increased user productivity
- 4 Improved access to corporate data
- 5 Improved employee access to tools and data

SOURCE: GARTNER GROUP, STAMFORD, CONN.

### SAS

Continued from page 29

house storehouse.

"The transaction processing database market is wrapped, but the decision-support database market isn't," Betancourt said. "The vendor that owns the data format for the data warehouse will have more success selling its tools."

#### Soup-to-nuts solutions

Analysts said SAS is among a handful of vendors, including Platinum Technology, Inc. and Intersolv, Inc., that have soup-to-nuts data warehouse offerings. But unlike the others, which are pushing a new crop of front-end tools to work with their back-end data management and middleware tools, SAS is coming at data warehousing from the other direction.

"Their installed base has been driven by end users, but the company needs to appeal to a new class of buyers," said Bill Gannon, an analyst at Sentry Market Research, Inc. in Westborough, Mass. "SAS' analytical tools are among the best in the industry, but many CIOs don't know the company, even though they spend millions of dollars a year on SAS software."

Users agreed. "Most people look at SAS [System] as an end-user tool," said Paul Centric, plant engineer at Cleveland-based LTV Steel Corp., a conglomerate of steel companies that uses SAS tools to pull data out of several legacy databases for use in a 350-user data warehouse.

Moving the data to a centralized relational database would have been overkill for the read-only analysis LTV users perform, he added.

"We didn't need record locking or the ability to back out in the event of a crash. If we were using Oracle, we'd have those

things, but we would need a professional staff just to maintain the database," Centric said. The SAS system can get "sticky" on real-time updating, but that's not a requirement of LTV's data warehousing applications anyway, he added.

SAS' biggest challenge is to convince IS shops that SAS System can handle corpo-

rate warehousing needs, according to Centric. ■

### COMMENTS?

See "How to reach us" on page 5.

### Unify

Continued from page 29

why not? Was an application failure due to lack of memory, disk space or some other resource?

"We're building intelligence into the application to automatically generate and report vital statistics about itself and its health," said Scott Canali, vice president of marketing at Unify.

The Unify application can pass data on some 400 predefined events to the AppMan client process (see graphic, page 29). This process works with an agent, also on the client, that is designed to translate the data into a format recognized by a management system, such as Tivoli Systems, Inc.'s Tivoli/Enterprise Console or BMC Software, Inc.'s Patrol.

Unify offers AppMan Console for those customers that choose not to use a third-party management platform to view the events collected and passed on by AppMan.

Developers can define additional events and use the AppMan API to define their own agents.

AppMan also works with electronic software distribution systems such as Tivoli Courier and Microsoft Corp. Systems Management Server.

Vision applications can be automatically distributed with the exact grouping of files and class libraries for particular groups of users.

"You had to code all these objects and facilities yourself in the past," said Charles Tarzian, president of Fairfield, Conn.-based Coyote Technologies, Inc., a developer of large-scale marketing systems. "Now Unify is providing all this for you."

He said Unify's approach will let MIS groups effectively centralize application management resources, more quickly identify the causes of poor application performance, as well as make and distribute changes to production applications more easily.

AppMan for Vision Release 1.0 will be available for Unix, Windows and Windows NT in February for \$1,995 per operating system per site. Simple Network Management Protocol support and additional agents will be added in May.

©Unify: (408) 467-4512.

*Unify's approach will let MIS groups effectively centralize application management resources, more quickly identify the causes of poor application performance, as well as make and distribute changes to production applications more easily.*



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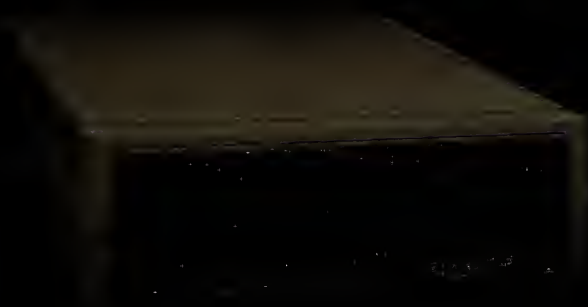
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## SHARED LOGIC

Marc Myers



## Studying the real cost of client/server projects

**A** study from the Technology Managers Forum International called "The Real Cost of Client/Server Computing" should be required reading for any company about to embark on a client/server project.

Based on interviews with 207 companies involved in client/server deploy-

ment, the 45-page report is brimming with information that could help you avoid costly mistakes that were made by these early adopters.

Among the more compelling sections is one called "Things We Would Do Differently Next Time." Most companies said not taking the time to plan properly

for the system was their single most serious error. But how could successful companies with average revenues over \$4 billion fail to plan a project?

The answer is that they probably did try to plan their projects but found that the traditional models for project development are inadequate for client/server.

Another interesting conclusion in the study is that these corporations are no longer looking to client/server as a cost-cutting mechanism. Systems are going to cost as much as they always have, if not more. Client/server now is being viewed as the most strategic way to build systems.

The study also contains tables that give concrete numbers on the costs for various client/server project models. Other tables contain response information on value judgment-type questions, such as: What are the primary forces driving your organization's client/server strategy?

The bottom line is that when you decide to sit down and cost out your upcoming client/server project, there is enough information in this study to help you make a decent estimate. Actual costs are delineated, and even more interesting, hidden costs are listed. Some significant hidden costs for client/server include training and the establishment of design standards.

Training costs often are associated with the purchase of new tools, so these should decrease as you deploy future applications with the same project teams and eventually stabilize as your client/server environment and development staff stabilizes. Two training types may be needed: tool-specific and tool-independent.

Tool-specific training is obvious — get the staff well trained in the development tools of choice.

In some cases, more general courses will be appreciated. This is the tool-independent training. For example, if the programming staff has no experience with client/server, they may require a general introductory class.

The establishment of design and development standards is one of the most difficult problems to solve. While some companies will pick a preset standard — for example, ISO 9000 — most prefer to customize standards according to their corporation's standard practices. This will take some time, so start small.

At Client/Server Connection, we've found that delivering a project within the prescribed budget is primarily a function of accurate requirement analysis. Fixed costs, such as hardware, software, training and product maintenance contracts, can be easily projected. It's the cost in human resources that can be tricky to estimate.

The report costs \$100 and can be obtained by contacting the Technology Managers Forum International at (212) 787-1122.

*Myers is president of Client/Server Connection, Ltd., a Cambridge, Mass., firm specializing in client/server software solutions. He can be reached at (800) 622-1108, Ext. 522, or via CompuServe at 71332,1726.*



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# Electronic Commerce

**Covering:** Tools and Techniques for Interenterprise Networking  
and Doing Business On-Line

## Briefs

■ The U.S.-based **Commerce-Net** consortium, created as a forum to address issues of Internet commerce, last week set up an affiliate in Canada. The Canadian faction will be managed by WorldLinx Telecommunications,

Inc., CYBERManagement, Inc. and SMART Toronto. Seventeen organiza-

tions, including the Bank of Montreal and the Canadian Imperial Bank of Commerce, have already joined.

CommerceNet: (415) 617-8790.

■ **StarNine Technologies**, a Quarterdeck Corp. company, last week introduced a **security tool kit** bundled with its Macintosh-based Web server.

The kit allows Web managers to serve encrypted Web pages and verify users through digital identifications. The WebStar/SLL Security Toolkit, which supports Netscape Communications Corp.'s Secure Sockets Layer protocol, has an introductory price of \$895. The tool kit will cost \$1,295 after Dec. 15.

QuarterDeck: (310) 309-3700.

■ **CE Software, Inc.** has announced WebArrange, a Macintosh-based **personal information management tool** that works with standard Web browsers to track Web usage, annotate URLs with text-based comment or pictures, and other tasks.

WebArrange is available free of charge for a limited time at [www.cesoft.com](http://www.cesoft.com).

■ **FTP Software, Inc.** unveiled a \$450 **TCP/IP application suite** for both Windows 95 and Windows NT that includes Internet mail software, File Transfer Protocol, terminal emulation, a Web browser and news-reader client.

FTP Software: (508) 685-4000.

## Realtors map out net for customer service

By Ellen Messmer  
Washington, D.C.

The National Association of Realtors has broken ground on an online service that will let agents print out maps of house locations based on client demands.

Expected to be up early next year, the Realtor Information Network (RIN) will let real estate agents find out which homes are for sale based on variables such as distance from local schools or transportation, price and features. Once candidates are located, the realtor can print out a map showing the locations to the potential buyer.

Unlike the simpler local Multiple Listing Service (MLS) search-query systems the realtors now use, the RIN database will

also contain area demographics on income, crime statistics and environmental data such as hazardous waste sites.

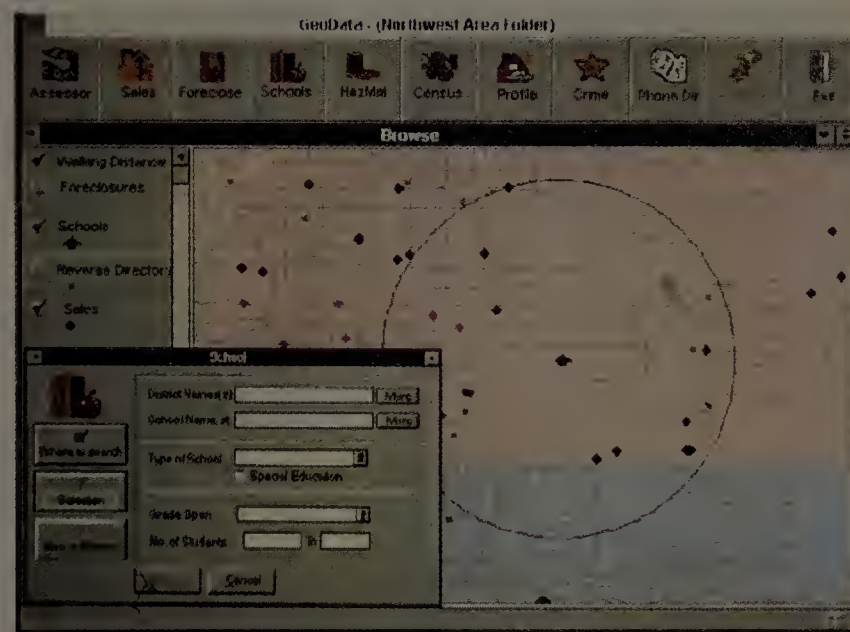
A better-informed home buyer should make purchasing decisions more quickly, said Iversen Moore, a spokesman for the National Association of Realtors.

RIN — which cost about \$10 million to construct — was designed by the consultancy Booz Allen & Hamilton, Inc. The RIN client software, called GeoData, was developed by Environmental Systems Research Institute, Inc., a Redlands, Calif.-based provider of geographic information systems.

Loaded onto a PC in a real estate office, the GeoData client software lets realtors make complex queries to a central server holding information about 80 million properties that MLS agents have agreed to list in RIN. The agent can print out a detailed map of home locations at a cost of just a few dollars.

RIN will augment, not replace, the simpler MLS systems

Visit some existing real estate Web sites. Link to <http://www.nwfusion.com>. Select News+ then Electronic Commerce.



RIN offers nationwide interoperability and lists 80 million properties.

now in use, Moore said.

However, RIN — based on technology called the Data Exchange Method, developed for the project by Booz Allen — offers nationwide interoperability. This is an advantage over the current incompatible MLS systems, which can make even regional searches impossible.

Home buyers themselves cannot access the RIN database. But the National Association of Realtors has what it calls an adjunct to RIN on the World-Wide Web at [www.realtor.com](http://www.realtor.com).

There, home buyers can

search through limited MLS listings and view photos of properties listed by specific real estate agents. However, to find out the owner's name and address, the Web surfer will have to contact the agent.

There are a handful of other Web sites springing up that offer the MLS inventory directly to buyers. But that is a touchy subject in the real estate industry. There are worries that the intervening Internet will bring the buyer and seller together easily, wiping out the agent's commission. ■

## BUSINESS SPACE

### Virtual plastic or paper?

**S**hopping. One of life's great pleasures. At least I think so. In fact, I like shopping so much that I am the only person to have out-shopped my wife. (It was 9:30 p.m. in the middle of an IKEA furniture store in Burbank when my wife cracked: "Take me home, I've had enough.")

Shopping on-line is a little different. For starters, you do not need to get dressed. If you want to shop in the nude, nobody will mind or even know.

Clothing preferences aside, the other big difference is, of course, that the entire shopping process is virtual.

So, what's required for the virtual shopping experience? Well, on-line, just like in any regular shop, the victim, err, . . . shopper, requires a shopping basket — something to hold the planned purchases before you take them up to the till (or would that be a "physi-

cal point-of-sales accounting and cash management module?").

As we discussed in some recent columns, retaining state information with a Web server is no trivial problem. Well, we nailed that one with a token system that places session data in the URLs of all documents retrieved.

Now what we need to do is tie the token system to a virtual shopping basket. If you have checked out any of the sites that take orders (for example, Pacific Moon's site at <http://silcom.com/pacmoon.com>), you'll notice that, for many of them, when you decide to buy something, you set the number of units you want and click on an "order this" button.

A variation of this purchasing process can be found at Virtual Vineyards (<http://www.virtvin.com>), where you add items to your shopping basket but don't set quantities



Mark Gibbs

until you complete the order. I think this strategy is flawed, as you lose the impulse component of retail buying.

Typically, when you first ask for a product to be remembered, a file is created and the item and quantity you are planning to buy is entered into the file associated with your session (or should that be experience?).

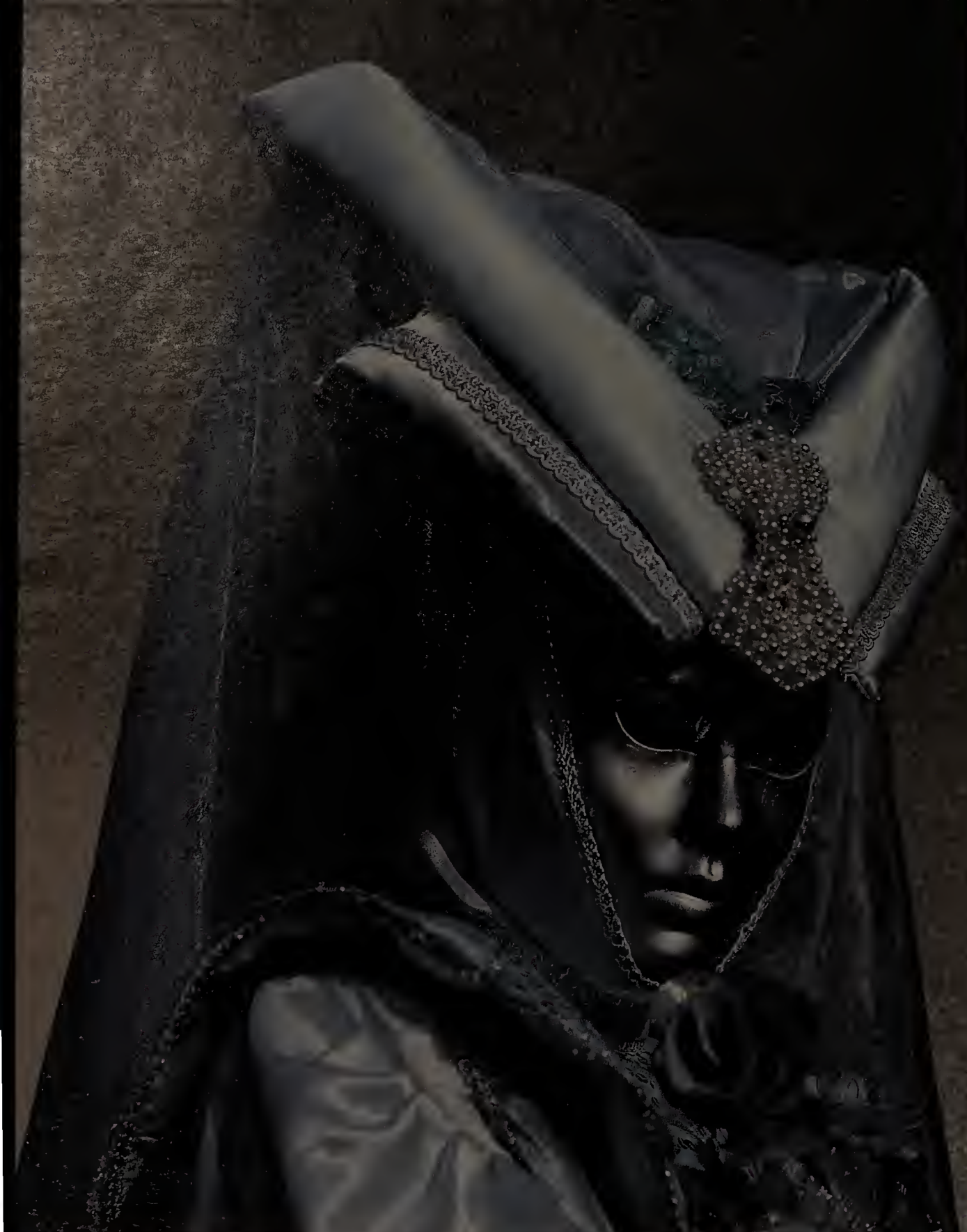
Every time your token is seen by the server, its age should be checked and the system should conduct regular surveys of the age of all existing shopping baskets. Age is important because a session that is older than a predefined maximum needs to be cleaned up — its shopping basket needs to be deleted (otherwise you could eat up lots of disk space) and any other session related data purged.

Shopping baskets are weak when handling complex attributes, such as size, color and style of a product, and when you need to change items in them.

So the next time you buy something online, consider how much work has gone into making the stateless Web server stateful, and in building a shopping basket on top of that.

Which sites have really great shopping baskets? Let me know at [mgibbs@gibbs.com](mailto:mgibbs@gibbs.com) or call (800) 622-1108, Ext. 504.





Your desktops are humming.

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# Technology Update

Keeping Up with Network Technologies and Standards

## NETWORK DESK

Network World tracks down answers to your questions. Please submit them to Dana Thorat via phone at (800) 622-1108, via the Internet at [djt@world.std.com](mailto:djt@world.std.com) or via fax at (508) 820-1103.

**Is there an industry average we can use to figure out how many people to put on our help desk staff?**

David Sackuvich via the Internet.

The short answer is no, according to the Help Desk Institute (HDI), a support services and training organization in Colorado Springs. However, you can use the following model to figure out what might be appropriate for your situation:

For each shift, determine the number of calls coming in to the help desk on a monthly basis. Then figure the average length of each call, which includes any time spent completing forms or updating a database. Also include any necessary follow-up calls.

Then add the average time to perform other tasks, such as research and sending electronic mail. Next, calculate the number of labor hours by multiplying the number of incidents by the amount of time spent on each incident.

That number is used to calculate the number of hours your help desk will be kept busy.

Divide the number of busy hours by the number of hours an employee is available at their desk to handle incidents—usually 135 to 160 hours per month. The result is the actual number of employees required to do the work. That number may need to be adjusted to meet your service-level objectives, part of which defines how fast you'll resolve cases.

If you want to establish staffing trends for the year, you can perform these calculations on a quarterly basis.

For more details, contact HDI for a free copy of its staffing model, which is a synopsis of a more technical research report by Stephen Murtagh titled "Staffing, Scheduling and Workforce Planning."

The report costs \$295 for HDI members and \$395 for nonmembers. HDI is available to answer any questions regarding the use of information in these reports.

For more information, call HDI at (800) 248-5667.

## And you thought frame relay was just for data

*Voice over frame relay becomes a reality in the wake of improved compression algorithms and maturing public networks.*

By Byron Henderson

During frame relay's early days, carriers largely discouraged use of the service for transporting on-net voice traffic, in part because they did not know what would happen when voice and bursty data traffic were combined and because quality delivered by compression algorithms was poor. But voice over frame relay has now moved into the realm of possibilities.

The feasibility of voice over frame relay comes with the maturation of public frame relay networks and advances in voice-compression technology.

Pioneering companies are finding it costs less to add frame relay bandwidth to support a few voice connections than it does to pay for toll calls. The cost savings have proven particularly significant for users that have moved intracompany overseas phone and fax traffic onto the corporate frame relay network.

Most companies are adding voice to existing frame relay locations, but some are using it to help justify bringing new sites onto the network. In other cases, companies use leftover bandwidth on the frame relay network when they cannot justify adding dedicated tie lines.

### At the user site

The renewed interest in running voice over frame relay is reflected in the burgeoning market for frame relay access devices (FRAD), customer premises equipment (CPE) that breaks voice and fax signals into frames for transport across frame relay data networks. Dataquest, Inc., a market research firm in San Jose, Calif., predicts worldwide end-user revenue for FRADs will reach \$408 million by 1998, more than doubling from \$203 million this year.

Two significant technological advancements are making it possible to support high-quality voice traffic over frame relay networks. The first is the result of improvements in the Algebraic Code-Excited Linear Prediction (ACELP) compression algorithm, which is being standardized by the International Telecommunication Union.

The ACELP algorithm compares incoming voice traffic to a standard model of the human voice. The FRAD then sends deviations from the model—not the entire voice signal—across the network. This significantly reduces the amount of bits that must be sent to construct the voice signal at the receiving end.

ACELP effectively can compress a conversation to 8K bit/sec. The algorithm also

frame-based network.

Cell-based backbones, which already are deployed by most public frame relay providers, minimize the latency of the network and the variation of delay for the traffic.

For optimal performance, users must assign a higher priority to voice traffic than to data. Since voice is delay-sensitive, it must not get stuck behind large data frames during transmission.

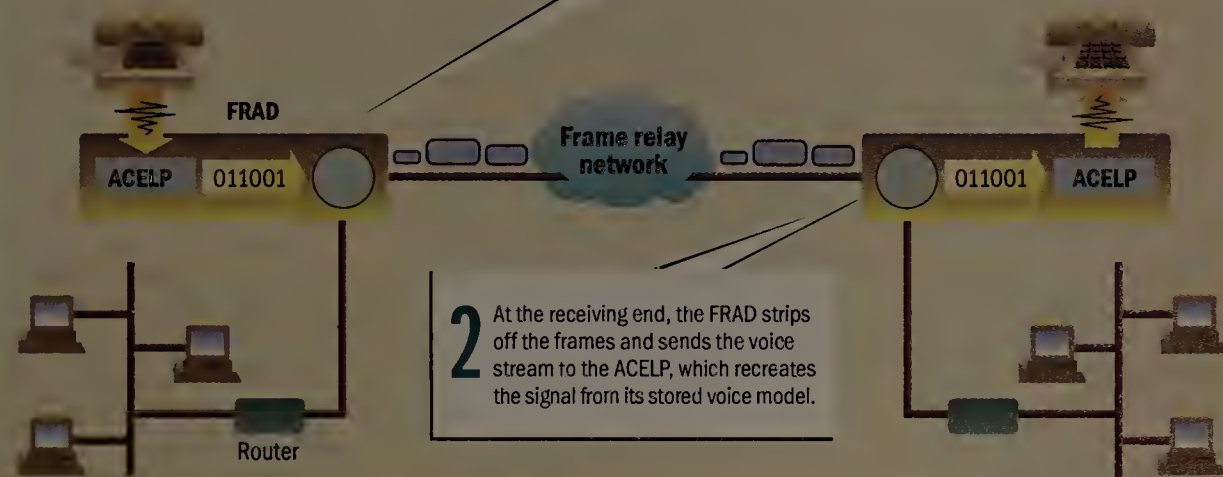
tion Agreement for FRADs that support voice over frame relay. The agreement would allow FRADs from different vendors to interoperate over a public frame relay service.

To date, the working group has defined a set of requirements that support a common mechanism for moving voice from one vendor's FRAD, across a public network, to another vendor's FRAD.

## HOW IT WORKS

### Voice over frame relay

Frame relay access devices (FRAD) break voice signals, which have been compressed by the Algebraic Code-Excited Linear Prediction (ACELP) algorithm, into frames for transport over a frame relay network.



handles fax detection and demodulation, as well as echo cancellation.

The second advancement comes from improved digital signal processor (DSP) technology. DSP chips now have the power to process the significant amount of information required by the ACELP algorithm.

### In the carrier net

In addition to installing FRADs, users that want to take advantage of voice over frame relay must make sure their carrier of choice has a high-speed, cell-based backbone. Voice traffic is intolerant of varying delay and network jitter. The delay variation of the frames is too great to provide quality support when voice is carried over a

Some FRADs have high-priority queues to which voice traffic is assigned.

Some public frame relay networks can prioritize traffic, as well. When frames arrive at a public network, they are transmitted on a first come, first served basis. To give voice frames priority over data frames, the public network must support priority permanent virtual circuits (PVC) or be able to appropriately handle frames that have been tagged as voice by a byte in the user data. This tagging of voice traffic is accomplished via proprietary methods.

### Standards update

A technical working group of the Frame Relay Forum is working on defining an Implementa-

The group also is working on an architecture for multiplexing data and voice into the same PVC. This will allow users of frame relay services to eliminate parallel PVC costs.

A final version of the Implementation Agreement is not expected before the end of 1996. Meanwhile, end-to-end voice connections over a frame relay network still can be accomplished when the same vendor's CPE resides at the sending and receiving sites. Most vendors will support standards once available.

Henderson is director of network access products for StrataCom, Inc., a San Jose, Calif.-based provider of frame relay and Asynchronous Transfer Mode products.



### EDITORIAL INSIGHTS

## Protect yourself now

**A**s local and long-distance markets get more competitive, carriers are paring costs by letting go tens of thousands of workers. That's hurt service, both on what we'll call hard service — getting lines provisioned and problems resolved — and soft service — the hand-holding help with design and planning that companies used to get from dedicated account teams.

Carriers have invested in automated service systems, which mitigate some hard service concerns, but it's gotten harder to find someone who can speak intelligently about a particular service. It's not unusual to get caught in voice mail hell trying to track down answers.

This situation is only going to get worse, what with the potential for sweeping telecommunications reform and an all-out assault by carriers on one another's markets. Consider what's happening at AT&T.

As part of its breakup plan, the company has offered job buy-outs to more than 77,000 workers. While AT&T isn't saying exactly how many jobs it will actually pare, analysts guesstimate the number is in the 20,000 to 30,000 range. Ouch.

Hank Levine, an attorney with the Washington, D.C. firm of Levine, Blazak, Block & Boothby who negotiates

custom network deals for big customers, says that will hurt AT&T where it has traditionally been strong: product management. As AT&T streamlines, Levine fears behind-the-scenes technical and engineering resources will be thinned out.

How do you deal with the changes AT&T and other carriers will go through in the days ahead?

■ Be aware that service will change. You may need to budget for more support from consultants or outsourcers.

■ Get detailed service-level commitments from carriers for critical areas and negotiate hard for specific arrangements that assure you get what you need in the way of hard service.

■ Make automation work for you. For example, Levine suggests you contract for the carrier to put a net management console on your site so you can order lines and enter trouble tickets.

■ Most important, don't put up with mediocre service. If you aren't getting what you need, get to someone higher up the carrier food chain and voice your concerns loudly.

In short, make sure your carrier works for your business.

John Gallant, editor in chief

jgallant@world.std.com

## Teletoons

By Phil Frank and Joe Troise  
guru@well.com



## Does anyone really care about the future of UnixWare?

**C**all me a cynic, but I think the goals of the alliance between Novell, Inc., The Santa Cruz Operation, Inc. (SCO) and Hewlett-Packard Co. to turn Unix into what is essentially the long-promised super-NOS are too lofty and will never be reached.

A few months ago, there was quite a hullabaloo about Novell restructuring and refocusing its product line. Part of that refocusing resulted in Novell selling its UnixWare business to SCO.

At the same time, Novell, SCO and HP announced a "business relationship." According to SCO, the companies intend to deliver "a high-volume Unix operating system that runs on standard hardware platforms and integrates their current desktop, workgroup and enterprise networked environments — protecting their investments while ensuring access to new technologies."

Hmmm. It seems we've heard ambitious claims like that before. If you believe them, I'd like to talk to you about oceanfront property in Arizona.

Hoping to capitalize on one another's strengths and installed base, each partner is supposed to focus on what it does best. SCO will consolidate its current OpenServer system with the newly acquired UnixWare into an Intel-based Unix operating system that has common interfaces with HP's own highly respected brand of Unix, HP-UX.

Unbundling its key networking services from NetWare, Novell will produce its NetWare Directory Services and file and print services for HP-UX, and integrate NDS with the Open Software Foundation, Inc.'s Distributed Computing Environment (DCE). Meanwhile, HP will drive the development of the 64-bit Unix operating system, which combines the RISC-based HP-UX and SCO's Intel-based operating systems.

Don't hold your breath.

First of all, three-way business relationships are difficult to manage, even under the best conditions. Companies tend to push their own agendas, and eventually partner infighting disrupts the product design and delivery plan. In my opinion, the best product integration happens under one roof, not three.

Even if the partners reach their goals and the products emerge as planned, it will probably be too late. In announcing the acquisition of UnixWare, SCO president and CEO Alok Mohan said, "Unix is the leading business-critical operating system server for large and small businesses today." I agree with him, but I don't expect the lead to last long.

Microsoft Corp.'s Windows NT already has grabbed the spotlight with those of you who might be the target market for these something-for-everyone Unix products. Many of you like the fact that you can implement one operating system for both the desktop and the server. Windows NT fits that bill rather nicely. Unix never will.

Windows NT also is taking the independent soft-



Linda Musthaler

ware vendor (ISV) community by storm, and developers aren't willing to wait for more Unix vaporware. Scarce development resources mean ISVs go where the volume is, and these days, it seems to be heading toward the Microsoft camp. Even developers that have traditionally played in the Unix arena are developing software for the NT platform. The list

includes such heavyweights as SAP America, Inc., Informix Software, Inc., Oracle Corp. and Sybase, Inc.

That's not to say that Unix is going to cede the entire market to Windows NT. There are some key players in the Unix market in the mission-critical applications arena, including IBM, Digital Equipment Corp. and HP. These companies always will have a place in corporate America.

But Unix, in general, has suffered because there are too many flavors of it on the market. IBM's AIX is not fully compatible with HP-UX, which differs from SunSoft, Inc. Solaris, and so on. This blatant

lack of compatibility makes it hard for an ISV to deliver an application that runs on all versions of Unix, so the ISV must choose just one or two. Otherwise, development and support resources would be stretched too thin to be effective.

From your perspective, Unix is often more costly to implement and support. Moreover, its lack of compatibility tends to scare many of you, who justifiably fear getting locked into a proprietary path. Ironically, Unix started out as a completely open environment. Not so anymore.

This latest shift in the ownership of UnixWare might be not only more

than developers can bear, but also more than you can bear. Sure, plans for the product sound good, but how long can you wait for them to become reality? The current time frames stretch into 1997 and 1998.

Do you really think that Novell, SCO, and HP will stay focused and remain friends long enough to deliver on all these promises?

The goal of all this posturing is to develop one 64-bit version of Unix that runs on Intel or RISC systems, which would merge all the NetWare and UnixWare variants into one operating system, and support the integrated NDS/DCE directory and remote procedure calls. One product, one unified Unix — right?

Well, perhaps not. Each partner in this venture will develop add-ons to differentiate their products from one another. And the cycle of incompatibility will start all over again.

Where, oh where, dear UnixWare? Does anyone really care?

Musthaler is vice president of research at Currid & Company, a Houston-based information technology consulting firm. She can be reached via the Internet at 75300.2660@compuserve.com or by phone at (713) 789-5995.



# Lotus' Web interface to Notes bodes a new era in client/server computing

**I**BM's announcement of a World-Wide Web interface to Lotus Development Corp.'s Notes (NW, Oct. 30, page 1) signals the end of a period in client/server computing. We can anticipate forward motion in the distributed computing industry, a new era in which standard clients will be able to handle a variety of proprietary applications and you will be freed from the thankless task of installing countless clients.

Originally, many client/server applications were designed only with LANs in mind because that was where the market was.

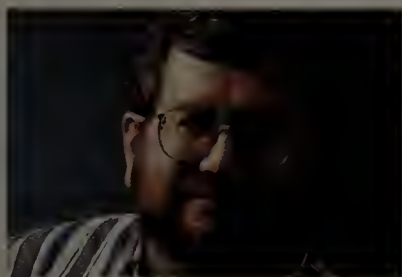
Everyone had a LAN, and in a LAN environment, distributing custom clients to each end user is no big deal; you let your LAN operating system do it. Vendors produced spectacular, easy-to-use products in a short time. Life was good.

With the advent of enterprise networking, it became obvious to everyone except the vendors that their approach did not scale well. Installing a special client is fine for 50 machines, but the approach falls flat when you have to deal with 5,000. Instead of seeing the writing on the wall, the vendors acted like they were the only game in town.

If you complained too much or threatened not to buy, the vendors' solution was to route IPX all over your enterprise and proceed as before.

Many of you with enterprise networks are doing just that, even though IPX is not designed well for large networks.

The problems with the traditional "distribute-a-client" approach are likely to get worse. With the movement toward telecommuting, employees must do the same operations over lower



Ed Krol

bandwidth, non-IPX links.

Employees also are on their own with their computer, so it is harder for them to get help from the MIS department. This direction again points to the need for one solid, well-known interface to all the information your end users need.

If vendors had looked at the competition, they would have realized that all of their interfaces looked the same. They all had on-screen forms with some amount of interactivity and

the ability to deliver multimedia presentations.

None of them realized this is exactly the target the Web has been pursuing for years. And it's a target that has almost been reached.

Web browsers are equivalent to generic interfaces. Once installed, a browser can contact a myriad of servers across the network and download screen formats. The end user must learn only one user interface for all products. Since all you are moving around are screen formats, and not executable code, the transmissions are quite modest in size.

Web browsers are well-known generic interfaces. Everyone already has them installed. (Just look at the stock prices of Netscape Communications Corp. and Spyglass, Inc.) People look forward to using them to access whatever they need, including traditional workgroup applications, with a shorter learning curve.

And I look forward to sending vendors which offer only "a really great Windows client" packing.

*Krol is author of The Whole Internet and assistant director for network information services at the University of Illinois at Urbana-Champaign. He can be reached at e-krol@uiuc.edu.*



## Debating ISDN

I agree with everything David Buerger said in his column on National ISDN (Nov. 13, page 110). My task group in the Information Industry Liason Committee has been trying to sort out the basic ISDN Primary Rate Interface and Basic Rate Interface services, and the set of options being offered.

So far, the RBOCs seem to be more interested in creating their own unique ISDN offerings and differentiating them from other carriers' offerings than in national interoperability.

One frustrating aspect of our task is the lack of technical description of their offerings. Replies to our requests for information included: "You have to sit down with our ISDN account manager in order to get a technical description of the service," and, "We don't publish a technical description of our ISDN service because it's proprietary."

In addition to the problem of high costs,

it seems that ISDN is being held back by its lack of interoperability within the RBOCs. It looks like the price of competition is a Balkanized U.S. public network infrastructure.

Don Berteau

Vice president, intelligent network products

GeoNet Limited, L.P.

Vero Beach, Fla.

Clearly too much hype has surrounded National ISDN. Those of us who have been tracking standards and working with ISDN for years know that protocols can be made a lot more user- and telco-friendly than what we have with National ISDN.

While we can sit back and slam ISDN's lack of progress over the past few years, the truth, which Buerger acknowledges, is that ISDN is sustaining annual growth of over 100%. Growth over 100% is not bad considering telcos have hardly begun to market ISDN, there is virtually no exposure to the average user and it is difficult to configure correctly.

What would happen if you could get ISDN as easily as a cellular phone from a computer outlet and the adapter for a PC and phone cost a modest \$200?

If that were the case, about 25% of households with PCs would have ISDN by the year 2000.

Telcos would obviously need to get a lot more efficient about support.

Lots of users are really upset with telcos and their handling of ISDN affairs. But face

it, there is no competition.

I agree that cable television and satellite feeds are interesting options with lots of potential, but they have a slew of problems of their own and are years behind ISDN.

Dory Leifer

Systems project coordinator

University of Michigan

Ann Arbor

## Mac is a viable alternative

I'm writing about Skip MacAskill and Melinda Le Baron's column "Windows 95: It just can't be avoided" (Oct. 30, page 26)

The Apple Computer, Inc. Macintosh has been an alternative to Windows for some time now. Cost analysis of Macintosh enterprise networks from Ingram Laboratories shows savings compared to DOS systems.

J.D. Power and Associates still rates Macintosh systems highest on user satisfaction and productivity. However, as we know, most MIS managers "just said no" to Macintosh.

In the long run, considering the cost of migrating from MS-DOS to Windows 95 by way of Windows 3.1, it's embarrassing how much time and money many companies could have saved by just jumping to the Macintosh a few years back.

Claude Baines

Imaging specialist

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Shreveport, La.

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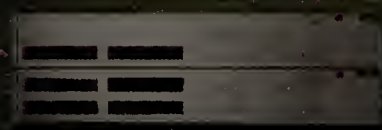
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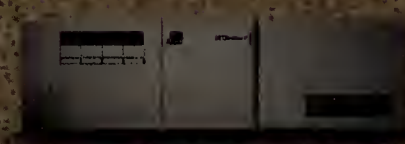
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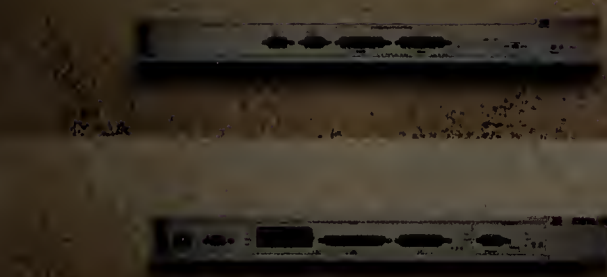
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### **A running start.**

Everything is designed for easy setup, so you'll be up and running in record time. A single CD-ROM provides one point of installation for all UPS management software (shutdown, OpenView, SNMP). What's more, utilizing HP OpenView, PowerWise even lets you configure and monitor multiple UPSs from a single screen.

### **Proactive protection.**

And once PowerWise is on line, it provides reliable, unattended shutdown of server and network operations. It monitors and predicts battery failure in advance. It even gives you remote central management through a single OpenView console and remote paging capability. Plus, it includes inventory reporting capabilities that display all the vital statistics of UPSs on your network. All of which leaves you more time to deal with the rest of your demanding job.

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\* List prices as of October 1, 1995. † PowerWise Assistant; shutdown, management and diagnostics software for Windows NT and Novell Netware (other OSs available separately). © 1995 Hewlett-Packard Company. All rights reserved.



# 'So you want to use ISDN...'

spotlight

I

SDN's time is now. Standards are more or less in order, availability is getting better, and the long-awaited killer applications have arrived in the form of remote office connectivity and Internet access. Now comes the hard part — outfitting all those small or home offices for ISDN.

Don't expect a lot of help from carriers in this department; you'll have to do a lot of the legwork on your own. But there are folks out there who can help, most notably your ISDN equipment vendor. We've also gathered some configuration tips to help you get the most for your money and prepare for dealing with myriad local phone companies.

Several developments over the past two or three years have led to the ground swell of interest in ISDN. First among them is the development of a national ISDN standard, commonly called National ISDN 1 (NI-1). It defines the way ISDN-capable devices signal their status (busy, available or no answer) to carrier switches. While this might seem like a basic requirement, before adoption of the standard, a device that worked with an AT&T switch, for instance, would not work with one from Northern Telecom, Inc.

The next important event was the development of a standard set of ISDN ordering codes (IOC). Unlike plain old telephone service, you cannot just plug any ISDN device into any ISDN line; the line has to be configured by the telephone company.

Before the standards came into place, that was an often tedious task that involved several false starts before successful completion. By adopting a standard set of ordering codes, the telephone company can set up a line to meet the code that corresponds to your equipment — J3 or J6, for instance. When you plug it in, there's a good chance it will work properly because installers can simply copy an existing configuration with the same code.

The development that boosted ISDN interest and availability more than any other was



GUY BILLOUT

**A guide to getting your remote and home office users in the communications fast lane.**

**By Steve Kalman**

the unprecedented growth of the Internet. At 14.4K bit/sec (the most common modem speed), the typical World-Wide Web page takes 3 minutes to load. At ISDN speed, it loads in less than 20 seconds.

This increase in speed has implications for traditional applications used in remote offices. For example, a 120K-byte file transfer takes 2 minutes at 14.4K bit/sec but only 10 seconds using ISDN, including the 2 seconds needed to "dial" and connect. With that kind of transfer time, you can consider having remote users access applications installed on servers at a headquarters LAN, instead of on each remote PC or laptop. Even applications of 500K bytes or more load in less than a minute, so they can be accessed only when needed, reducing licensing costs.

If you decide on a massive ISDN rollout to all your remote or home offices, first make sure ISDN is really available. While there appears to be universal coverage, it just isn't so.

Bell Atlantic Corp., for example, assumes responsibility for getting ISDN to its sub-

*Continued on page 44*



Continued from page 43

scribers and will bear the cost of bringing you the service from wherever the nearest ISDN-equipped central office (CO) might be. Its neighbor, NYNEX



Corp., has a different attitude. Unless you live within 18,000 feet (as the wire runs) from a CO with ISDN, you pay for the repeaters and other equipment needed to get it to you.

It's conceivable that you could have a user in the remote office call the local 800 number to order service—if you fill them in on the IOC information, it should be a breeze. Ordering the same terminal adapter (TA) for each site makes matters simpler. The only question the phone company is likely to ask is if the internal ISDN jack needs to be an RJ-45 or RJ-11. The answer to that will be in the TA product documentation.

## Configuration options

When you order Basic Rate Interface service, you get two separate 64K bit/sec bearer, or B, channels. You can aggregate the channels to support a 128K bit/sec path, although you aren't limited to purely digital signals. You can use either B channel to support a traditional voice, fax, or 28.8K bit/sec modem call using your old analog phone, fax machine or modem.

Depending on your telephone company's switch, you may even be able to get two phone numbers, one for each B channel. If you buy one of the more sophisticated ISDN TAs, it will have jacks for two analog devices.

## WHO YA' GONNA CALL

ISDN information numbers for major carriers:

**Ameritech:** ..... (800) 543-4736  
**AT&T:** ..... (800) 222-7956  
**Bell Atlantic:** ..... (800) 570-4736  
**BellSouth:** ..... (800) 428-4736  
**Cincinnati Bell:** ..... (513) 566-3282  
**MCI:** ..... (800) 955-6505  
**NYNEX:** ..... (800) 438-4736  
**Pacific Bell:** ..... (800) 472-4736  
**SEC:** ..... (800) 792-4736  
**SNET:** ..... (800) 430-4736  
**Sprint:** ..... (800) 877-5045  
**\*Stentor (Canada):** (800) 578-4736  
**\*USWEST:** ..... (800) 728-4929

\*Faxback service

When one B channel is in use, the TA can handle calls on the other channel. If the B channels have been aggregated and one of them is needed for another purpose (sending or receiving a fax, for instance), the TA will drop one of the channels and handle the fax, then bring the channel back up when finished. There will be a corresponding loss in data-transfer speed but only temporarily.

Even when a line gets dropped, there is often only a minor noticeable difference. Communications ports can crank at about 115K bit/sec, of which 80% is data. (Start and stop bits account for the remainder, or 23,000, of those bits). The result is 92,000 bits of data, far greater than the 64K bit/sec capacity of a B channel. But when two B channels are bonded together, there is no way for a standard communications port to feed them fast enough; it would have to ship out data at 160K bit/sec.

The most obvious way to get around this problem is to use a faster communications port. There are some port adapter cards that use the Model 16650 UART, the chip that adds/removes the start and stop bits for serial communications, rather than the standard 16550 UART found on most PCs. The 16650 can pump out data at 230K bit/sec, more than enough to fill both B channels.

Another solution is to go with an internal TA. For desktop units, you can get an ISA-based card. For laptops, there are PCMCIA models. This bypasses the communications port entirely, although you won't be able to plug older analog devices into the line. If you want to use the ISDN line for anything else, this method won't do.

Some manufacturers turn to Ethernet technology to get around the limitations of the serial port. As long as the workstation can run an operating system such as Windows for Workgroups, Personal NetWare, Windows NT or Windows 95, it has the software to form and send Ethernet packets. You can then use an Ethernet adapter card and connect it to the external TA using common Category 3 (or better) twisted-pair

cable with RJ-45 connectors. For those who use a laptop at home and connect it to a LAN when in the office, this presents an attractive alternative.

To work effectively, telecommuters and those in remote offices also need to have the appearance of maintaining a connection all day. But keeping the line up for that length of time is cost prohibitive. It's easy to spend \$80 per day, or about \$2,500 per month.

You can get around that prob-



→ You'll save lots of time on any ISDN installation project by first checking out these on-line resources:

- Dan Kegel's home page, which has pointers to nearly every useful tidbit of ISDN information. It's a must.
- An ISDN-specific FAQ (frequently asked questions) file at MIT that's updated every two weeks.

To connect to the above, link to <http://www.nwfusion.com>. Select NetRef, Technology Resources then WAN Services.

→ On CompuServe, you'll find the ISDN forum (GO ISDN) and Telecom forums (GO TELECOM) are great resources for getting your questions answered.

→ If you prefer the printed word, here are a few good books on ISDN:

- ISDN for Dummies*, David Angell, IDG Books, 1995
- ISDN Second Edition*, Gary Kessler, McGraw-Hill, 1993
- The ISDN Literacy Book*, Gerald Hopkins, Addison-Wesley, 1995

lem using the spoofing software that often comes bundled with ISDN routers. ISDN calls coming into the data center router are passed to the network. After a short time of inactivity, the router will drop the ISDN link but won't tell the network server the connection is lost. Instead, it will continue responding to watchdog packets on behalf of the remote device.

When the remote user again wants to access the server, D-channel signaling is used to bring the connection back up, typically in just 2 to 3 seconds.

This technique will work when the router knows each and every packet to spoof. Watchdog packets are easy to spot, as are Routing Information Protocol and NetWare Server Advertisement Protocol packets. Applications that send nonstandard packets that are broadcast to all stations can get quite expensive.

There have always been peo-

See ISDN, page 77

# Diary of an ISDN installation

The author's own saga

Oct. 12

**10:02:** Called local business office to ask about ISDN, was given Bell Atlantic Corp.'s 800 number.

**10:04:** Called the 800 number, listened to recording, chose "residential service," was told it would be available in "early November."

**10:06:** Called the same number, chose "business service," was put on hold.

**10:18:** Reached operator who, reading from a form, asked several questions to which I had no answer, such as which brand of terminal adapter (TA) I was going to use and whether it needed an RJ-11 or RJ-45 jack. I asked for clarification, but she was unable to supply it. I was also given an 800 number for the equipment department at Bell Atlantic.

**11:08:** Logged on to CompuServe, found ISDN forum, asked questions.



Oct. 13

**08:06:** Checked CompuServe ISDN forum. Received messages from several people, had all questions answered and was directed to read several FAQ files in the libraries. I was also told to visit Dan Kegel's home page at [www.alumni.caltech.edu/~dank/isdn/index.html](http://www.alumni.caltech.edu/~dank/isdn/index.html), where I would find pointers to nearly every useful tidbit of ISDN information on-line. They were right.

Oct. 16

**09:15:** Called the 800 number again, got a different operator. I was able to answer their questions but stumped them with a request to set up for two different TAs (one for my laptop, one for the desktop). They promised to call back.

Oct. 19

**15:15:** Bell Atlantic called back and asked me to pick one adapter. I demurred. The carrier finally agreed to install two jacks, an RJ-45 and RJ-11, so I could use whichever cable came with the TA. (Note: This would not solve the problem because the lines have to be configured differently by the phone company depending on the TA in use.) I ordered service and was promised a Nov. 1 installation date. I was told to call by Oct. 27 with the TA information for my "initial" setup.

Oct. 23

**10:15:** Called the equipment department 800 number. It turned out to be a vendor of ISDN TAs.

**11:30:** Back on-line at CompuServe's ISDN forum. Asked for TA recommendations. Received plenty. Was also given advice to buy 3Com Corp. Impact TA and check out 3Com's Web page.

**14:20:** Surfing the net at <http://www.3com.com>. Great page. Lots of useful information about ordering and setting up ISDN, along with complete product line information. Decided to order Impact.

Oct. 26

**09:00:** Received a fax from Bell Atlantic with details about my ISDN line installation. Called back the number on the form to tell them I had a TA with an ISDN ordering code (IOC) of 3ComA.

Nov. 1

**09:15:** ISDN installers arrive—one "experienced tech" (this was his third installation) and one trainee. The experienced tech told me it was easy to set up my line; he would just copy the configuration of another one that was already set up for a 3ComA.

**11:00:** Installation complete, including some in-house wiring.

**11:15:** Configured my TA. Involved running a Windows program that sends some character strings (called SPIDs) to the TA. The fax that came in on Oct. 26 had all the information I needed.

**11:45:** Connected to an Internet service provider using ISDN.

Nov. 8:

**10:00:** Just for kicks, I called Bell Atlantic to see if residential service was available. I got a recording telling me it would be available "the first week in November."

By Steve Kalman



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# ISDN routing made simple

GET YOUR BRANCH OFFICES  
UP ON ISDN WITH ONE OF  
THESE FOUR ROUTERS.

spotlight

By Bob Larribeau

One of the most effective ways to roll out ISDN for branch office use is by employing ISDN routers, devices that shuttle traffic between an Ethernet LAN and one or more ISDN connections.

We tested four ISDN routers at the high end of the range for branch offices and small offices. The Symplex Communications DR-I stood head and shoulders above the rest in terms of power and ease of use. Advanced Computer Communications' (ACC) Danube and 3Com Corp.'s NetBuilder Remote Office 427 were solid performers but rather difficult to learn and use, plus the NetBuilder works only with certain NT1 devices. Xyplex, Inc.'s 3850 also operated well but was difficult to set up.

The Symplex DR-I is the only product in the group designed to support ISDN from the ground up, and this forethought shows in both its performance and ease of use. The DR-I was designed to support bridging as well as IP and IPX routing over ISDN. It also supports one or two dedicated line connections using serial ports that can handle data rates of up to 500K bit/sec.

The ACC Danube, 3Com NetBuilder and Xyplex 3850 belong to families of routing products in which ISDN was more of an afterthought, added on top of frame relay, SMDS and dedicated-line implementations.

All three can bridge or route a range of protocols—including IP, IPX, AppleTalk and DECnet—and support a variety of routing options, such as Routing Information Protocol, Open Shortest Path First, Border Gateway Protocol and static routes.

There were some interesting differences in performance. Figure 1 shows the performance of each product using two B channels on one Basic Rate Interface uploading and downloading compressed and uncompressed

versions of a 295K-byte Excel spreadsheet file. The calls for these tests were made between our San Francisco laboratory and Ann Arbor, Mich., for Symplex, and between San Francisco and Littleton, Mass., for Xyplex. The calls for ACC and 3Com were made between two ISDN lines in our lab. This should have put Xyplex and Symplex at a disadvantage, but, in fact, 3Com's NetBuilder was no faster than the Xyplex 3850, and Symplex's DR-I was the fastest of the group.

3Com's NetBuilder supports only per-packet ISDN compression and not history-based compression, which probably accounts for it being at the low end of the performance in the group. History-based compression looks for repetitive data patterns across multiple packets, while per-packet compression looks for repetitive data patterns only within a single packet.

History-based compression is more effective, but it requires more memory to maintain a history buffer. Performance was more consistent when sending the incompressible file, with a maximum variation of 10% between the fastest and slowest performers.

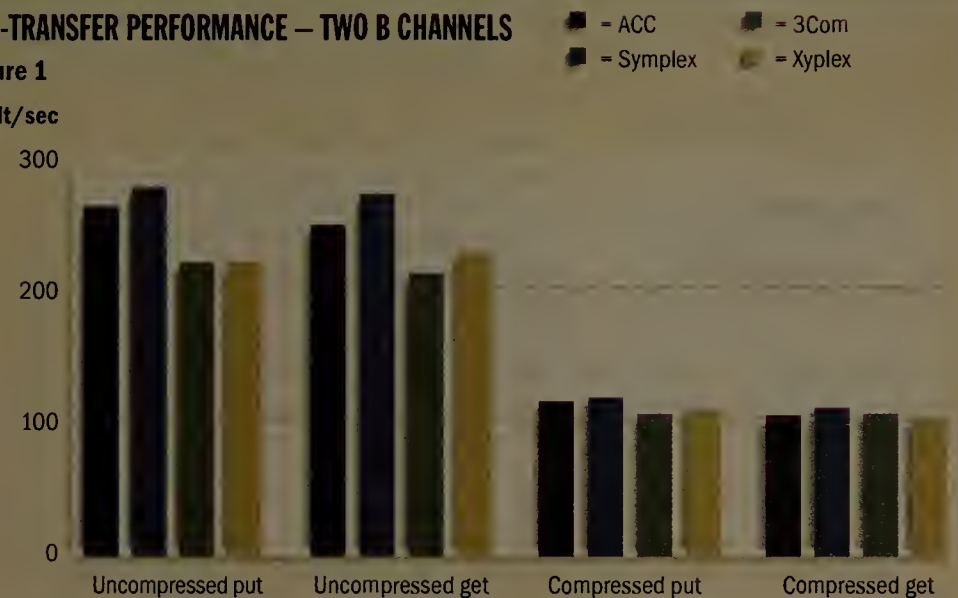
The Xyplex 3850 supports two BRIs, while the Symplex DR-I supports four. To test the higher number of B channels that these products support, we uploaded and downloaded a NETSCAPE.EXE file and a PKzipped version of that same file (see Figure 2, page 48).

Our tests with two BRIs on the Xyplex 3850 gave us nearly twice the performance of a single BRI, as expected. However, the improvement on our compressible file was a disappointing 30%. This makes us wonder if

FILE-TRANSFER PERFORMANCE — TWO B CHANNELS

Figure 1

K bit/sec



the 3850 has the computing power to drive compression to its full performance potential with more than one BRI.

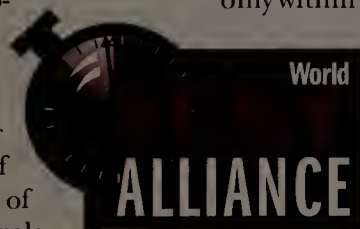
The Symplex DR-I ran all tests easily. There was a drop in performance as B channels were added, more so with the compressible file than the incompressible file. Going from six to eight BRIs improved performance on the compressible file by 13%, about half the maximum potential performance improvement of 25%. The incompressible file was 19% faster, or about 80% of potential. In any case, throughput of 400K bit/sec using four BRI lines in a \$3,800 product is impressive cost/performance.

We ran the tests on the DR-I with all B channels set as permanent calls in order to eliminate the effects of the performance degradation inherent in dropping and setting up calls. The DR-I has an option to keep a call up at all times, which can be useful in a flat-rate calling environment such as within a Centrex group.

We also tested connection times using 64K bit/sec clear-channel ISDN connections. The times were all in the 2- to 3-second range, which is three to four times faster than the connection times we measured using 56K bit/sec ISDN calling in previous tests (NW, July 10, page 41 and April 3, page 48). The connections for ACC's Danube were about 2 1/4 seconds when calling between two ISDN lines in our office. This is a "best case" call.

All four of these products use demand dialing—that is, they make an ISDN connection based on the presence of traffic to the remote location. They keep the connec-

Continued on page 48





Continued from page 47

not up as long as the traffic persists and bring it down after a user-configured timer expires. We found that once any of these



four products is set up, you can forget about it. It will make and break connections appropriately based on traffic. This minimizes your usage charges, while the quick connection times of an

time than establishing a link. ACC's Danube and Xyplex's 3850 are available as a chassis and one or more interface modules that you can assemble yourself, which lets you or your integrator buy the chassis and interface modules separately.

ACC Danube, 3Com NetBuilder and the Xyplex 3850, as tested, all had S/T interfaces that required an external NT1. NetBuilder has one unusual characteristic: It requires phantom power be supplied before it will initialize the ISDN line.

Phantom power is an option that provides a relatively small amount of power on the four signal pins of the ISDN S/T interface, usually as a backup power source. 3Com had to lend us a pair of AT&T NT1U250 NT1s because the Alpha Telecom NT1s in our lab couldn't supply phantom power, although they worked just fine with Danube, the 3850 and every other S/T interface device we tested.

Danube, NetBuilder and the 3850 all have complex command-line interfaces that require a tedious setup process that asks you to enter the Service Profile Identifiers (SPID) and directory numbers, set up the dialing and PPP parameters for each B channel, bundle the B channels into a multilink group and turn on compression — either for each B channel or for the multilink group. You then set up IP routing, assign IP addresses to the local Ethernet interface and to the ISDN inter-

faces (if numbered interfaces are used), and set up the static routes.

The Xyplex 3850 has a Windows-based graphical interface utility called FocalPoint that writes a configuration file to a boot diskette, which you then install in the 3850. At least, that's the way it's supposed to work. Due to poor documentation, we needed technical support assis-

up the 3850 directly using its command interface.

3Com's NetBuilder has a "menu" command that makes it easier to use than the ACC or Xyplex products. For each command, the unit can display a list of options and lead you through them so you don't have to remember exact syntax.

For NetBuilder, Danube and the 3850, we found ourselves

With guidance from each manufacturer, we got over the rather steep learning curves of these three products and became reasonably comfortable with each of them. Formal training for each product may be well worth the investment in time.

#### Routing test runs

Once the setup was complete, we tested our channels of com-

## MORE ON-LINE

See how 64K bit/sec ISDN outdoes the older 56K bit/sec service, and grab the FAQ list from the comp.dcom.isdn newsgroup. Link to <http://www.nwfusion.com>. From the main menu, select NetRef, Buyer's Guides and Reviews then ISDN Routers.



ISDN line gives you response times close to what you would see on a dedicated line.

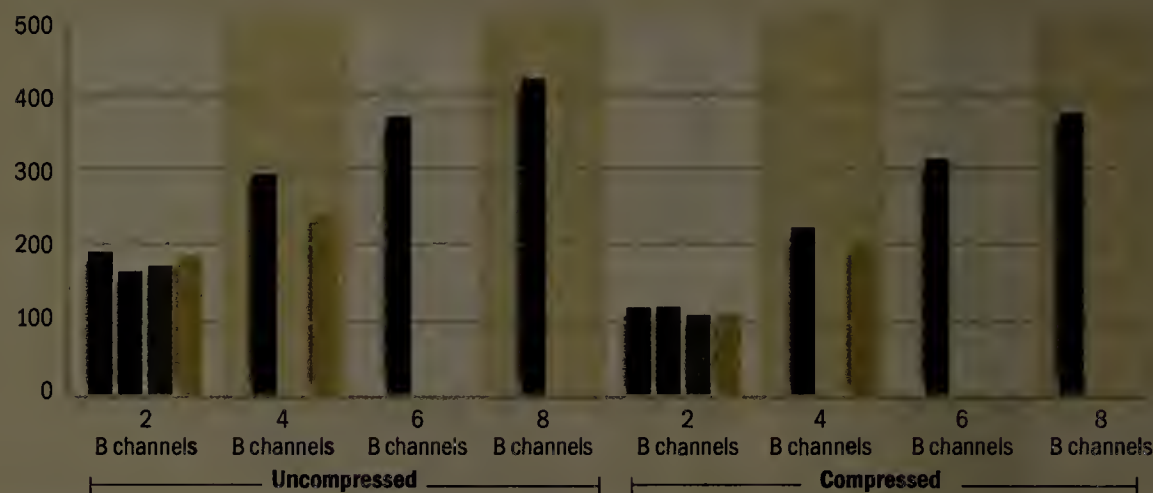
#### Installation and operation

Putting most of these products to work requires little more

### FILE-TRANSFER PERFORMANCE — MULTIPLE B CHANNELS

Figure 2

K bit/sec



tance to use FocalPoint and ultimately found the configuration file it built didn't work; we had to modify it using the command-line interface on the 3850 itself. FocalPoint also does not support the entry of static routes, so you have to enter them into the 3850 manually.

All things considered, we suggest you skip FocalPoint and set

constantly referring to the documentation. These three products come with a formidable set of documents or a CD-ROM. We found it difficult to find the information we needed using the CD-ROMs, but it appeared that the CDs would be of more use once you understood the product well enough to know what you were looking for.

munications. ACC Danube and the Xyplex 3850 require that you make the first connection directly to a remote unit rather than making a loop-back call to another local B channel. This can make isolating problems more difficult because it's harder to tell whether a problem is related to ISDN configuration, PPP, IP or an authentication issue.

Setting up the Xyplex 3850 was particularly difficult. It was not until we started working with one of the development engineers that we were able to get on-demand dialing with four B channels working. This engineer showed us how to simplify the configuration and set up the options that control ISDN as a backup facility to get the on-demand dialing to work.

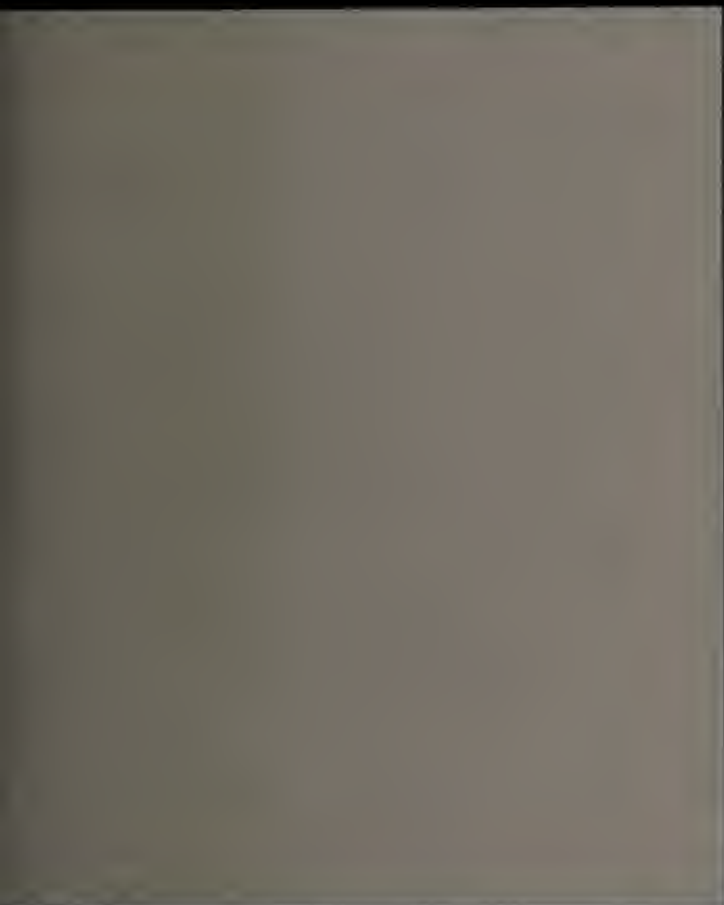
3Com's NetBuilder lets you make a loop-back call from one B channel to another on the local ISDN line to verify the ISDN operation before connecting to the remote unit. Once this local call is successfully completed, any remaining ISDN problems are likely to be limited to setting the 56K/64K bit/sec speed correctly or, in rare cases, long-distance carrier issues.

The Symplex DR-1 is much easier to use, partly because it does not support as many options as the other products in this test. The main reason, however, is that the DR-1 automates many of the functions that require manual setup in the

## NetResults

Product	Danube	DR-1	NetBuilder Remote Office 427	3850
Vendor	Advanced Computer Communications (805) 685-4455	Symplex Communications Corp. (313) 995-1555	3Com Corp. (800) 638-3266, (408) 764-5000	Xyplex, Inc. (800) 338-5316, (508) 952-4702
Price as tested	\$1,995	\$3,799	\$3,995	\$3,695
Configuration tested	1 ISDN S/T interface, 1 10Base-T connection	4 ISDN U interfaces	1 ISDN S/T interface, 1 serial interface: V.35, RS232, RS-449 or X.21	2 ISDN S/T interfaces, 1 10Base-T connection, 12-port managed 10Base-T hub
Network interface	10Base-T or 10Base5	10Base-T and 10Base5	10Base-T and 10Base5	10Base-T or 10Base5
WAN protocols supported	ISDN, PPP, frame relay, X.25, SMDS, HDLC/LAP-B	ISDN, PPP	ISDN, PPP, frame relay, X.25, SMDS	ISDN, PPP, frame relay, X.25, Xyplex Communications Protocol
Network protocols supported	Bridging, IP, IPX, XNS, AppleTalk, DECnet, DLsw	Bridging, IP, IPX	Bridging, IP, IPX, XNS, AppleTalk, DECnet, VINES, OSI, LLC2 tunneling, DLsw	Bridging, IP, IPX, AppleTalk, DECnet, OSI
Pros	▲ Easy to reconfigure for a broad set of applications. ▲ Performed well in all tests.	▲ Very easy to use. ▲ Excellent price/performance. ▲ Performed well in all tests.	▲ Supports other WAN services with its RS-232/RS-449 interface. ▲ ISDN can be used for backup and overflow.	▲ Optional physical interfaces provide 2 ISDN connections or let ISDN back up a permanent connection.
Cons	▼ Difficult to set up and use.	▼ Does not support frame relay or SMDS.	▼ Difficult to set up and use.	▼ Very difficult to set up and use. ▼ Poor performance with 4 B channels.











other three products. That makes it a good choice for remote offices where there are no technical people.

When you power up the DR-1, it leads you through a set of menus to enter the SPIDs and directory numbers of the local and remote BRI's and the unit's local IP address. It then automatically creates the multilink groups that bind B channels together, and also automatically makes a synchronization call to all of the configured remote sites and learns the IP addresses of the remote networks.

The unit uses this information to set up static routing table entries. The automatic operation of the DR-1 eliminates many of the tedious, error-prone steps required to set up the other three products.

The DR-1 has a suite of tests that you can use to verify its operation. The LAN test verifies the local LAN using ping commands. Separate WAN tests verify voice capabilities, by making a call from the DR-1 to any nearby voice telephone, and data setup, by placing an ISDN data call from the DR-1 back to itself. The final test is to make a call to a remote Symplex unit and pass data between them.

#### Troubleshooting tools

Getting the information you need to isolate a problem in an

ISDN network is important in order to maximize uptime and minimize operation costs. All four of these products support telnet access, which allows you to examine and configure them remotely.

The ACC, 3Com and Xyplex units provide ping commands that let you test the WAN as well as the LAN. The Symplex DR-1 can ping only the LAN connected to the Ethernet port. We found that we did not need the ping command in the DR-1 because its automated setup avoids some of the problems that we ran into with the other products. The DR-1 also provides an easily accessible list of the addresses that it has discovered on both the local and the remote networks.

The DR-1 has an event log that describes actions that take place and problems that occur. We like having a log file, but we found that there is not enough detailed information in Symplex's log to determine the source of many problems. More detailed information may be appropriate only for the expert, but equipped with this information, an expert can resolve problems more quickly.

On the other hand, the logs on the Xyplex 3850 were as good or better than the Q.931 protocol trace that we were seeing on our NCC7000 protocol analyzer.

## Which one is for you?

**Y**ou can buy a low-end ISDN router such as the Ascend Communications, Inc. Pipeline 25 for less than \$1,200, so why would you spend between \$2,000 and \$4,000 for one of the products we tested? We came up with several reasons:

- **Throughput**—Many low-end ISDN routers do not support compression, so a product that does provides more than four times the throughput for about three times the price.
- **Protocol support**—You may need to route protocols other than IP and IPX, such as AppleTalk, DECnet and OSI, and support common routing protocols, such as RIP, OSPF and BGP.
- **Upgradeability**—Low-end routers may require you to make upgrades manually via telnet. A better option when you're managing multiple routers is products that use the Trivial FTP protocol.
- **Ease of hardware configuration.**

For an assessment of how well each of these products meets these criteria, see the accompanying story on Network World Fusion.

We recommend testing any ISDN product before putting it into operation; simple performance tests can be illuminating. You should also test devices using your applications in an on-demand connection environment to be sure that the network protocols and applications do not keep the line up more than the minimum time necessary to transfer data.

Get more detailed information on each vendor's offerings on-line. Link to <http://www.nwfusion.com>. Select NetRef Buyer's Guides and Reviews then ISDN Routers.

## HOW WE DID IT

Our original intent was to test these ISDN routers by making FTP transfers to a server at each company's facility using 64K bit/sec ISDN calls. We were able to do this with both Symplex and Xyplex using a 133-MHz Pentium PC running Windows NT and the Microsoft FTP client to communicate with an FTP server running on a Sun Microsystems, Inc. workstation. From our site in San Francisco, we connected to Symplex in Ann Arbor, Mich., and Xyplex in Littleton, Mass.

We tried to do the same thing with ACC in Santa Barbara, Calif., but we were limited to 56K bit/sec data calls due to the lack of support for 64K bit/sec data calling in GTE's network there. We also had problems arranging access to a workstation at 3Com Corp. in a way that met their corporate network security guidelines. For both 3Com and ACC, we ended up bringing in two routers and running our tests between two ISDN lines in our lab. We used the same Windows NT FTP client and a Windows NT FTP server on a 66-MHz 486 PC.

Our FTP tests included uploading and downloading four files. We used a 295K-byte Excel file, along with a PKzipped version of the same file, which was 76K bytes long. This

spreadsheet file was highly compressible, while the PKzipped version was incompressible.

To test the higher performance multi-B-channel products, we used the executable file for the Netscape Communications Corp. Navigator 1.2N 32-bit version, which was 1.36M bytes long. We also used a PKZipped version of the file, which was 625K bytes long. The NETSCAPE.EXE file is clearly much less compressible than the spreadsheet file.

We used a Network Communications Corp. NCC7000 portable protocol analyzer to perform additional protocol checking. The NCC7000 supports Basic Rate S/T and U interface monitoring, as well as Primary Rate Interface monitoring. It is capable of displaying the D-channel Q.921 and Q.931 signaling protocols and the X.25 packet switching protocol on the D channel. It is also able to display PPP on the B channels, including showing the PPP Multilink Protocol that is implemented using both B channels at the same time. The biggest advantage of the NCC7000 was that it gave us a stable platform to work from when we started testing a new product.

The Xyplex also has a monitor command that provides a real-time update of the logs so you can watch them while a connection is being established.

This monitor command can also be used to show other continuously updated displays. Monitoring the circuit summary display showed the B-channel connections being made and broken. All ISDN product manufacturers should take a look at how Xyplex has implemented these logs.

ACC Danube displays messages about its functions, including ISDN, PPP, dial ports, multilink groups or compression, on-line while you are working. We found this disconcerting while we were trying to enter commands. We also found that these messages were difficult to interpret. While they did give us general ideas on how to resolve problems, it was not always clear what they meant. We used these messages to make educated guesses rather than define specific solutions to problems.

The Xyplex 3850 has a configurable log that can be accessed after a problem occurs to see what has happened. Just about every aspect of the operation of this system can be included in this log. For ISDN, it includes both the Q.921 Layer 2 events as well as the Q.931 Layer 3 events. Most of the time, eliminating the chatty Layer 2 heartbeats and showing only the Layer 3 messages is the right approach. We used this log to identify ISDN calling issues and to communi-

cate them back to Xyplex for resolution.

3Com's NetBuilder gave reasonably informative messages but did not provide the detail available with any of the other three products. We found ourselves depending on a protocol analyzer to solve problems with NetBuilder.

We also were able to identify several knotty problems by using the NCC7000 portable protocol analyzer. The first ACC Danube that we received had a bad ISDN interface card. It was able to establish Layer 1 communication but not Layer 2.

The messages the Danube gave were not that helpful, but the NCC7000 made it clear Danube was not responding to the Layer 2 messages from the network. Based on this information, ACC shipped us a replacement Danube and it came up right away.

When we found that some of the products would not answer calls, we looked at the full text of the SETUP message that was being received and saw that Pacific Bell's network was delivering a seven-digit rather than a 10-digit phone number.

When we changed the local number from 10 to seven digits, these products accepted calls just fine.

We saw strange behavior from the Xyplex 3850 when we were testing with four B channels. Three calls were being set up from the same B channel rather than three different B channels. Since a B channel can support

only one call at a time, the 3850 was clearly operating incorrectly.

Product configuration is also a consideration. ACC Danube includes a single Ethernet port and a single ISDN port. The Symplex DR-1 included a single Ethernet port, four ISDN ports and two serial ports. 3Com's NetBuilder includes a single Ethernet port, a single ISDN port and a serial port. The Xyplex 3850 we tested included a single Ethernet port, two ISDN ports, a high-performance processor and a 12-port hub.

Users should consider not only performance, but also the packaging that meets their needs. All things being equal, however, we found the Symplex DR-1 the most impressive ISDN router of the bunch.

The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 39.

Larribeau founded Larribeau Associates, a consulting firm based in San Francisco that specializes in ISDN technology, marketing and applications. He has been working with ISDN for 10 years. Larribeau has organized ISDN conferences for the California ISDN Users' Group for the past two years. You can reach him at [bob@larribeau.com](mailto:bob@larribeau.com).



## NT Server

Continued from page 1

chine," says Alistair McDougall, a consultant with the New York financial services firm. "The hardware costs are much less with NT Server. And with Microsoft's BackOffice client software license, you save a lot of money over NetWare and Unix."

Not only does Windows NT Server 3.51 have an aggressive base price, McDougall says, but

els. Over the short term, IDC says, NT Server and The Santa Cruz Operation, Inc.'s (SCO) Unix will emerge as the preeminent database server platforms until Novell, Inc. can implement some form of task switching to allow NetWare to support both file and database operations.

"The hardware costs [for NT Server and Unix] are going to be similar, but licensing issues and ongoing support are the big tickets you need to evaluate closely,"

grator of front-end Windows-based clients and back-end net services, freeing users to move onto other tasks and reducing the costs spent on desktop-to-server integration.

"You've got to add a lot of components to get [NetWare servers] to the level of functionality you want," says Tony DeLima, group manager of technology planning and integration at Ryder System, Inc. in Miami. "With NT Server, the BackOffice services mean we don't have to integrate as many applications from third parties." Ryder currently supports about 76 NetWare servers.

John Carse, a technical analyst with Houston-based integrator Paranet, Inc. and an on-site contributor at Amoco Oil Co., says Microsoft also has done a credible job integrating NetWare with NT Servers. "With the client services available for NetWare, [Microsoft's] protocol stacks of IP and SPX allow you to connect directly to the server, easing access to NT Server and NetWare back ends," he says.

Cowen & Co.'s McDougall points out that network services, such as security and directory, are tightly coupled across BackOffice services. "With NT Server, you access services and applications through a single logon," he says. "Mixing in another server [operating system] would introduce a headache in terms of support."

Another key point is that all NT Server management utilities are based on the same graphical user interface, which reduces the learning curve, saving users time and money.

"Once you learn how to administer one NT Server system — say SQL Server — the concepts and tasks are similar across the other BackOffice products," says DataLink's Flotta.

NT Server also provides the ability to set up a single management domain from which you can administer

network accounts on any workstation or server. "You can issue all sorts of remote commands and kick off other administrative services without leaving your desk," Carse says.

## The scaling issue

If there's been a consistent rap against NT Server, it comes from rival Unix camps that claim the operating system doesn't

scale well to handle large transaction processing applications.

"Microsoft has done a stunning job of positioning NT as the server for all things," says Grover Righter, vice president of strategic marketing for SCO. NT Server's basic ability to scale from PC platforms to larger systems is probably sound for commodity-level transaction applications, he adds. The problem is at the leading edge, where users require exceptionally high levels of transaction throughput.

That's an area where Microsoft has partnered with companies such as Digital Equipment Corp., Hewlett-Packard Co. and others to offer NT Server on larger systems. Digital, for instance, has promised NT Server clustering, and several symmetric multiprocessing (SMP) versions are in the works.

"What will be interesting is when we see the Tandems of the world embrace and offer NT Server on that kind of platform," McDougall says. But that type of product will come with limitations, Righter counters.

"The dirty little secret that will come out from the [NT

Server] OEMs is that they've added value to the source code they've paid a fortune to get," Righter says. "That means adding value will interfere with applications on other versions of NT Server, so there will be the need for revision synchronization at some point."

Database engines from Oracle Corp., Informix Software, Inc. and Sybase, Inc. also perform better on Unix machines than on NT Server platforms because the database companies are putting their tuning efforts into Unix. "The database companies make more profit in the Unix environment and,

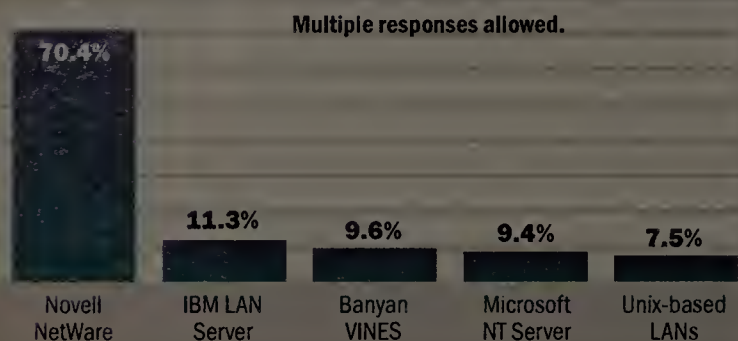
therefore, favor it for tuning and support," says Scott Winkler, operating systems analyst at Gartner Group. Only user complaints and competitive pressure will change the landscape, he adds.

Still, in terms of hardware, SMP servers for the Windows environment continue to follow PC pricing trends and are "significantly less expensive than their integrated Unix-based counterparts," according to a

Continued on page 52

## NT Server's challenge

Percentage of large and midsize companies employing various LAN operating systems:



SOURCE: IDC, FRAMINGHAM, MASS.

third-party database engines and other products also often cost less for the Microsoft Corp. environment than for Unix or NetWare LANs. Besides that, NT Server is easier to administer and comes with a gaggle of extra protocols and network services — including a TCP/IP stack, remote access and system backup — that are expensive add-ons for other products.

Exact figures on the cost benefits of NT Server are hard to come by. Consultancies including The Burton Group, Gartner Group, Inc. and International Data Corp. (IDC) have yet to release their cost-of-ownership findings, and most user companies either don't have reliable data or won't part with it.

But one thing is clear: Windows NT Server is attacking the status quo on at least two fronts. NetWare users view it as a versatile file and print server that doubles as an application server, while shops like Cowen & Co. are considering it as a cost-effective alternative to Unix as a high-end application platform.

Indeed, IDC estimates that NT Server will gain the most share of any file server in the network operating system market through 1998, entrenching itself in the No. 2 spot behind NetWare.

On the application server side, IDC suggests that NetWare's inability to support file and print services alongside database services on a single platform will result in performance degradation to unacceptable lev-

els. Alok Kapoor, a consultant at Design Strategies in New York.

With NT Server 3.51, Microsoft offers a concurrent use license, dubbed the Per Server license option, that lets a specific number of clients access a server simultaneously. This option is attractive for companies that deploy communications, Internet and remote access servers, for instance.

Microsoft also has a standard Per Seat license, whereby you purchase a Client Access License for each desktop device that will access the server. The Per Seat license allows a desktop PC user to access any NT Server on an enterprise net, which includes Microsoft's BackOffice servers.

Also, users say NT Server is less costly than NetWare because you can buy single-unit Client Access Licenses. With NetWare, you may be forced to purchase licenses in increments of 50 or 100 users. "With NT Server, you pay for only what you need," says Chris Flotta, a network integrator with DataLink Associates in Bethlehem, Pa.

## Integration issues

Another chief reason users are injecting NT Server into their environments is that Microsoft then becomes the chief inte-



"Microsoft has done a stunning job of positioning NT as the server for all things." SCO's Grover Righter

## Net exec serves up server OS tips

Ryder System, Inc. is evaluating Microsoft Corp.'s Windows NT Server 3.51 as an application server to sit alongside existing Novell, Inc. NetWare file servers. Tony DeLima, group manager of technology planning and integration, laid out a handful of server operating system requirements:

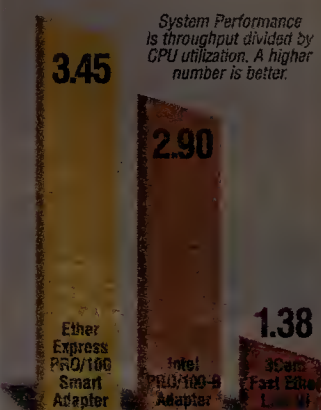
- Support for a static, interprocess communications interface, such as Microsoft's OLE, so server-based applications can talk to one another.
- Database services that exploit the operating environment. Since the database sits on top of the server operating system, it needs access to the operating system for security and performance reasons.
- A built-in middleware component to provide access to heterogeneous data repositories.
- Security features that are built-in, not offered as an add-on.
- Directory messaging services that exploit the server operating system environment. With NT Server, Microsoft's Messaging Application Programming Interface supports messaging via the operating system.
- Systems management facilities that are present in the operating system and exploit standard hardware and middleware services.
- Support for TCP/IP, IPX and SNA protocols that is bolted into the server operating system as standard components.
- Support for extended file names.
- The ability for the server operating system to launch multiple applications simultaneously. That's where the built-in crash protection of NT Server comes in handy: If an application does not behave properly, the operating system throws it out.
- A hardware abstraction layer in the operating system that provides logical access to devices, not just physical access. This typically leads to support for multiple hardware platforms.
- Support across a broad range of hardware platforms.

By Charles Bruno



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\*SOURCE: LANQuest Labs, September 1995

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Continued from page 50

by a member report by Winkler.

While Unix can still scale to greater heights than NT Server, the report states, "The gap has been closed somewhat in the past few months." The combination of NT Server 3.51 and SQL Server 6.0 operating on a six-processor Pentium machine can now go head-to-head with the weakest of the Unix systems, IBM's RISC System/6000, Winkler says.

Paranet's Carse says Amoco uses Oracle's database engine, and he "would like to see it set up on an NT Server box. It's probably easier to manage."

Some NT Server users already are using the product for transaction processing applications and are satisfied with its performance.

Paul Friesen, IS manager at IWA+Community Credit Union (CCU) in Vancouver, operates a full-function retail banking

system based on NT Server that handles 30,000 transactions per day.

IWA+CCU conducted extensive testing by running NT Server on a quad-processor 80486 machine. All transactions involved three to five relational joins and had a response time of less than 3 seconds. "It worked out that we could support up to 300 users with that kind of performance," Friesen says.

Jeff Freund, MIS director at Orlando

Health Care Group in Maitland, Fla., says the company is using NT Server to support a transaction processing application that serves 24 sites and more than 100,000 members.

The company replicates core patient data across its different servers in the greater Orlando area, giving health care workers access to records, no matter what office a patient may visit. "It handles the loads we've thrown at it without any problem," Freund says.

#### Role-playing

SCO's Righter sees equal opportunities for Unix and NT Server in the future at the expense of NetWare. "I'm one who believes there will be Unix, there will be NT and there will not be much else in 10 years," he says.

In the meantime, he adds, NT Server will fill a role as a server for general file and print operations, personal productivity tools and for a huge collection of decision-support software for small businesses or workgroups.

Unix, he says, will have a distinctly different role. It will become more powerful as the enterprise server for transaction processing applications and the de facto wide-area server to manage transactions among companies. "That is not something that either NetWare or NT Server architectures lend themselves to today," Righter says.

Adds McDougall, "We see NT Server as a long-term bet. It may not offer all the things we need to downsize mainframe applications just yet, but that will come." ■

Not too long ago, one of the barbs making the rounds about Windows NT Server was that its initials stood for "not there." Well, anyone looking for NT Server info on the Web will surely find that NT Server has arrived.

#### Among the better sites we found:

- **inforMation:** A well-organized collection of materials, including downloadable applications, graphics, lists of informational Web sites, virus information, consultants and hardware compatibility information. It also includes a list of NT-specific user groups — complete with hotlinks. At last count, there were 39 domestic and international groups listed.
- **Microsoft's NT Server licensing info:** Go to the Licensing section from the home page and you'll find basic licensing info and a tool to calculate how many licenses you need.
- **Windows NT Resource Center:** Includes interviews with Microsoft technical gurus and product news blits. Operated by Beverly Hills Software, an Internet consulting and design firm, it also features an NT Web Site of the Week hotlink.

You can reach all these sites via Network World Fusion. Link to <http://www.nwfusion.com>. From the main menu, select NetRef, Technology Resources, then LANs and Network Operating Systems.

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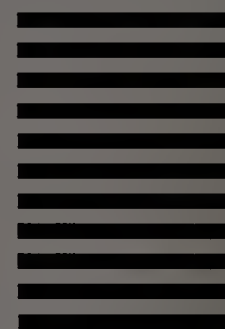
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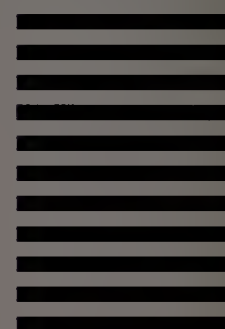


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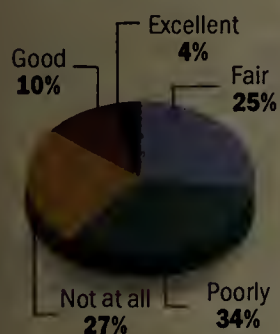
## Briefs

■ **Managers at the Knowledge Imperative Symposium** in Houston last September agreed they need to capture the knowledge of workers across the organization and make it available electronically but admit they aren't yet doing a good job, according to survey results released last month.

Based on responses from 80 of the more than 500 managers at the **Arthur Andersen and American Productivity & Quality Center-sponsored** event, the survey finds 79% think it is essential or important to have in place the technology needed to capture, store and distribute knowledge. The rest thought it to be fairly or slightly important.

However, when it came time to answer how well they currently perform the task, here's what the managers said:

### HOW WELL IS THE JOB GETTING DONE?



The survey was based on Arthur Andersen's Knowledge Management Assessment Tool, a benchmark for measuring how well organizations manage knowledge.

Arthur Andersen: (312) 507-9668.

■ **The Arcnet Trade Association (ATA)** has published its 1995-1996 resource guide.

The guide includes a brief history of Arcnet and lists manufacturers, suppliers and users of the technology. The trade group also now has a World-Wide Web site at <http://www.arcnet.com>.

ATA: (708) 960-5130.

## Help desk helping hand is just a hotlink away

By Jim Brown

As any help desk operator will tell you, when the questions roll in, you just keep answering them. And that's what we've been doing as you've called upon the Network Help Desk for information on creating a help desk or improving one.

Over the last few months, readers have asked for everything from advice on how to handle irate callers to what goes into crafting an automation strategy.

This week, for example, we answer a question about using an industry average to determine help desk staff size (see story, page 37.)

In searching for answers to your questions, we've spent some time rummaging around the online world. Here are some of the better resources we've found:

The University of New Hampshire maintains a frequently asked questions (FAQ) file on the help desk topic. While the FAQ gives fairly broad answers to common questions, it has an exhaustive list of help desk resources, including links to a number of college sites that have published pointers on how to develop help desk policy. A number of these colleges also use the World-Wide Web to provide a front line of defense, a strategy Dataquest Worldwide Services Group, a consultancy in Westborough, Mass., said is starting to look attractive to information systems managers (see graphic).

UNH's FAQ also has links to major help desk vendors' Web sites and points you to sites with help desk freeware.

Among the sites listed in the UNH FAQ is CompuServe's Support Technology Forum, which houses documents available for downloading.

Monarch Bay Software, Inc.'s Help Desk Handbook, for example, found in the forum's help desk library, covers factors that go into building a help desk — from defining staff qualifications to determining hours of operation and staffing levels.

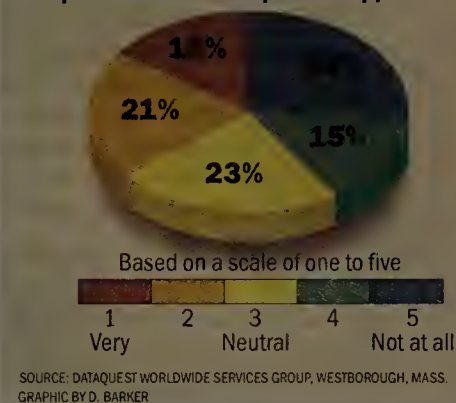
Another article in the same library, titled "The Knowledge-based Support Center," spells out the benefits and drawbacks of automating certain help desk

functions.

If you're implementing client/server technology or upgrading desktop platforms, take a look at an article posted in Gartner Group, Inc.'s Web site that helps you predict how many more calls your help desk will receive. The Stamford, Conn.-based consulting firm's article, "Applying the Help Desk Predictive Call Model," examines how to predict the influx of help desk calls at two fictitious organizations, one that is adopting new desktop plat-

### HELP ON THE WEB

The World-Wide Web's attractiveness as a replacement for telephone support:



forms and another that is adopting collaborative computing applications. ■

## ComNet show to ring in new year

As the new year approaches, so too does a new batch of conferences, including ComNet '96, one of the oldest networking shows around.

Now in its 18th year, ComNet will run Jan. 29-Feb. 1 in Washington, D.C. New to the show are a revamped conference track structure, half-day tutorials, an engineering track that provides advanced training and insights into various technologies, and an electronic commerce track that covers various aspects of doing business on the World-Wide Web.

The new conference track structure lumps 81 sessions into what show organizers call "views" and "threads." Nine different views cover a spectrum of specialties, including private and public network infrastructure, services, applications, systems management, engineering, electronic commerce, enabling technologies and federal regulations.

One view is dedicated to user case histories and implementation strategies. The case histories include a presentation from CSX Corp. on how it implemented video servers over an Ethernet LAN as well as a two-way videoconference that demonstrates how the House of

Blues nightclub chain implemented a collaborative distance-learning application.

Sessions within each view cover material from one of 13 threads, which include topics such as network access methods, ATM, LANs, multimedia and security.

There also will be five one-day tutorials and more than 20 two-day tutorials running Jan. 29-30. Among the two-day tutorials are a guided tour of LiveNet, an enterprise network constructed especially for the show, and Fiber U, a training session for fiber optic cable installers. A series of 14 half-day tutorials will run Jan. 30 and Feb. 1.

Discounted registration is available until Dec. 15 and ranges from \$395 for one day of conferences to \$1,295 for full conference and tutorial attendance.

ComNet: (800) 545-3976.

More details about these and other conferences can be found on Network World Fusion. Visit <http://www.nwfusion.com> and select Careers.



### Other shows in January

■ The 1996 RSA Data Security Conference runs Jan. 17-19 in San Francisco. Sponsored by RSA Data Security, Inc., the conference features a series of general sessions that cover a broad set of topics, from Micro-

soft Corp.'s plan for electronic commerce to the introduction of an Internet Law Task Force that will attempt to develop international legal standards for the Internet.

Other tracks are dedicated to security software developers, cryptographers, analysts and security technology. The conference also will include a series of product presentations.

Registration is being handled by Layne Kaplan Events and costs \$495 until Dec. 31. After that, the cost will be \$695.

Layne Kaplan Events: (800) 340-3010.

■ MacWorld Expo runs Jan. 9-12 in San Francisco. The event features 15 separate conferences covering Macintosh use in specific environments including education, multimedia and entertainment.

Two tracks are of special interest to networking professionals: The Connectivity Conference will cover everything from remote LAN access from a Macintosh to the latest developments in using TCP/IP in Macintosh environments.

The WebMaster/WebDeveloper Conference will help users understand how to use Macintoshes as Web servers.

Full registration for MacWorld Expo is \$175.

MacWorld Expo: (800) 645-3976.

**World Fusion**  
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Visit <http://www.nwfusion.com> for links to the World-Wide Web sites mentioned here. After you log in, select Careers.



Microsoft has opportunities for talented individuals who share our vision of making "Information At Your Fingertips" a reality worldwide. Start thinking about the impact you could have in one of these Seattle area roles:

## Network Engineering Program Manager:

Specify/design hardware, software and networking equipment for the Microsoft Network's worldwide TCP/IP network. Requires 3+ years experience as a project manager/lead in an Internet environment. Experience with ISDN, Cisco, DNS, Firewalls, Frame Relay, telco provisioning, UNIX®, Windows®, Windows NT™ and Internet client/server applications preferred.

## Software Design Engineer:

Design and develop client/server components of a mail system for the Microsoft Network and the Internet. Includes responsibility for all aspects of the Microsoft Network's messaging system including transports, servers and Internet gateways, as well as integration with corporate, LAN-based systems. Requires development experience with C/C++, Win32 and MAPI. Familiarity with Internet protocols, SQL and client/server architecture desirable.



## Microsoft Network Release Engineer:

Ensure enhancements/changes to the IP network are planned and deployed in a systematic manner. Involves defining metrics/tools and procedures for data collection; establishing quality goals; and implementing systems which will allow improvements to be attributed to single procedural changes. Additional responsibilities include ensuring procedural consistency in the test labs and the operational data center, and interfacing with network partners. Requires experience using sniffers to diagnose network problems; a background configuring routers and bridges; and network administration experience, involving set-up of DNS servers, primary backup domain controllers, and miscellaneous Internet servers. Knowledge of TCP/IP networking, including address assignment, and subnetting dynamic routing protocols essential.

A Bachelor's degree in Computer Science or a related technical discipline preferred for all positions. Microsoft offers competitive salaries and excellent benefits. **Email your resume in ASCII text format to y-walt@microsoft.com (Indicate Dept. Ad8h5-1204 in the subject header), or mail it to: MICROSOFT CORPORATION, Attn: Recruiting, Dept. Ad8h5-1204, One Microsoft Way, STE 303, Redmond, WA 98052-8303.** No phone calls. We are an equal opportunity employer and support workforce diversity.

**Microsoft**

## Calendar of Events

Microsoft technical managers and recruiters will be conducting interviews at the following industry events. Send us your resume today. We'll get back to qualified candidates with details.

**December 6-7, 1995 • Database Expo – New York, NY**

**December 11-14, 1995 • 4th International World Wide Web Conference – Boston, MA**

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LEFT**

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## Ready to impact the U.S. network services market?

Racal Network Services Inc., a subsidiary of Racal-Datacom, Inc. and part of the \$2 billion Racal Electronics Group, is building its market presence in the U.S. for managed network services. Achieving this goal will involve a SONET fiber backbone with the popular Racal Premnet conversion unit and a complete range of voice and data service interfaces without the need for a complex switching infrastructure.

If you're skilled in the following areas and want to be in on the ground floor of establishing high quality corporate network services with a major presence in the industry, RNSI would like to discuss the possibilities!

**Operations Manager:** Responsible for network installation, operation/performance and diagnosis/repair 24 hrs. a day and 365 days a year at the Manhattan Network Management Center. Requires 10+ yrs. telecom operations experience, with 5+ of those yrs. in a senior management position; background in operating with telecom providers in New York as well as with the contracting unions; in-depth practical knowledge of modern data transmission techniques/equipment. Technical degree and/or Racal Premnet and CMS experience desired.

**Network Applications Manager:** Responsible for all aspects of service design (basic service specs for each service and configuration information) in order to build the network within short lead times and with quality performance. Requires BS/MS degree in a related technical field; 5+ yrs. experience in a technical leadership role with a major telecom company, with at least one major network design installation. Experience with a telecom start-up company preferred. Specific skills must include fiber transmission systems at speeds up to SONET OC48; and data transmission using accepted protocols; Network Management Systems (i.e., Racal CMS); detailed knowledge of U.S. transmission circuits/tariffs; and router network design/configuration.

**Sales & Marketing Officer:** Executive authority and budgetary responsibility for sales, system engineering, marketing and commercial development of RNSI services. Requires business-related degree and MBA; 10+ yrs. experience (major portion of experience at the executive level in NYC); significant sales experience in communications services, retail, securities banking and professional services, including background in business development and start-up operations. Strong interpersonal and motivational skills are a must. Travel (NYC, U.S. and Europe) also required.

**Major Account Manager:** Responsible for all aspects of RNSI's relationship with major accounts, including closing new business, sales revenue, long-term business and account development planning. Requires business related degree; 7+ yrs. extensive sales/marketing experience, largely at executive level in NYC; significant sales experience in communications services, retail, securities banking and professional services, including background in business development and start-up operations; and ability to negotiate long-term contracts. Must be a team player with strong interpersonal skills. Travel (NYC, U.S. and Europe) also required.

[Common requirement includes a familiarity with at least one word processing, spread sheet, drawing and e-mail package.]

RNSI offers a complete compensation and benefits package. For confidential consideration, send your resume and recent salary history to: Central Florida Staffing (24895KT); RNSI; 608 Delaney Park Dr.; Orlando, FL 32806. Candidates should indicate Ad #24895KT when applying by E-Mail to: Racal\_Staffing@fl03.racal.com

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Data Com products manufacturer seeks experienced datacom professional to develop OEM/Contract business. Excellent comp. pkg. & benefits. 70% travel. Send resume & salary history to:

Ken Schneider  
**Telebyte Technology, Inc.**  
270 Pulaski Road  
Greenlawn, NY 11740  
(516)423-3232 x444

Needed F/T GIS RESEARCH ENGINEER to conduct research in integrating network prog. + combinatorial optimization in a geo-relational data model for Transportation Planning (TP). Duties include: building GIS models, spatial capture tools & carto. sys. in AML & C/C++; QC procedures; teaching, training & support on GIS; net. sys. admin. for SGIs & PCs; writing tech. prop. Training provided to the qual. appl. in TP & AML.

Req: M.S. in CS; 6 grad. units in net. prog. + comb. opt.; 8 month of research expr. in enabling database technology for an engr/sc. app.; taught a subj. in comp/infor. sciences in 2 academic terms. SALARY: 39520.00/YEAR. SEND RESUME TO NM DEPT. OF LABOR, 501 MOUNTAIN ROAD N.E., ALBUQ, NM 87103. JOB ORDER #42778



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- Network Programming/Protocols
- Relational and Object-Oriented Databases
- Client/Server Architectures
- Telco Technologies/Operations/TMN/OMNIPoint
- X/Motif
- API Definition
- Test Automation
- Code Coverage



- Performance Analysis
- Simulation
- Desktop Management Interface (DMI)
- Security/Authentication/Encryption
- Team and Project Leadership
- Extensible Agents Architecture
- Configuration Management

### PUBLICATIONS

- FrameMaker
- html/sgml
- Interactive On-line Help



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Go to the Careers section on Network World Fusion at this address. Four past weeks of Networking Careers can be found under Job listing.

## NETWORK DESIGN ENGINEER

General Communication, Inc. (GCI), is an Anchorage based long distance telecommunications company. We provide a broad spectrum of telephone, advanced data communications and network integration services to over 100,000 customers throughout Alaska.

We have an immediate opportunity in Anchorage for a Network Design Engineer who has special hardware design expertise. Ideal candidates should have a Bachelor's degree in Electrical Engineering or Computer Science and 3 years of data communications experience. This challenging position requires extensive knowledge of data communications systems analysis/design and communications theory/principles. You will need in-depth understanding of state-of-the-art LAN/WAN technologies such as Ethernet, Token Ring, FDDI, CDDI and Frame Relay as well as expertise in network elements such as Hubs, Routers, Bridges and Switches. In addition, you will need extensive knowledge of networking protocols such as SNA/SOLC, LAT, TCP/IP, IPX, SNMP and X.25.

In return for your technical talents, we offer excellent compensation and benefits. For consideration, please forward your resume to:

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**FAX: (907) 265-5490. Job Hotline: (907) 275-3038**

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We are seeking individuals with a unique combination of networking expertise and sales support skills for the following areas:

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Tulsa, OK	Oklahoma City, OK	Albuquerque, NM

An additional 20+ cities will be added throughout the next year.

Your challenge will be to assist our sales staff with the development of networking solutions that provide our customers with the most advanced and cost efficient design to meet their service requirements. You will develop and present technical proposals and assist with the successful implementations of these services. Your experience should consist of at least 5 years of LAN/WAN, Frame Relay, ATM, computer applications, ISDN, voice, and sales engineering experience.

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At MAXNET, our vision encompasses an in-depth understanding of today's multivendor enterprise networks, and recognizes opportunities for emerging technologies. We continually find new ways to improve upon existing ideas, and develop creative solutions for network challenges. Our entrepreneurial spirit, progressive work environment and love for technology enabled us to become one of the fastest-growing network integrators in the United States.

Due to our rapid expansion, MAXNET has Networking Sales & Engineering opportunities in the following regions: **New York Metro Area, Mid-Atlantic, Southeast and Midwest.** If you've got a competitive edge and share in our vision, we'd like to set our sights on you. The following positions require excellent written and verbal communication skills.

### NETWORK SYSTEMS ENGINEERS

Positions are available for Network Systems Engineers at a variety of levels for pre- and post-sales customer support. Opportunities range from installation and service to full-scale design and analysis. Minimum 2-3 years LAN & WAN experience.

### NETWORKING SALES

Experienced, senior-level professionals to represent MAXNET's network integration services to existing clients, and to the networking industry's top manufacturers. Should be able to set up remote offices and establish a new customer-base. Track record in systems sales with Fortune 1000 clients required. Full pre- and post-sales support provided.

MAXNET offers top compensation, where Engineers & Salespeople earn considerably more than the industry average. Qualified applicants, please send your resume to our Corporate Headquarters located at: **1915A Hollywood Blvd., Dept. NW-EY, Hollywood, FL 33020**, e-mail to: [hrevaz@4maxnet.com](mailto:hrevaz@4maxnet.com), or fax to: (305) 926-6683. E/O/E



For more information on MAXNET and the latest opportunities throughout the U.S., visit us in the Marketplace under Direct Connect, at <http://www.nwffusion.com>.



## UNIVERSITY OF NOTRE DAME

### NETWORK ANALYST POSITIONS

The Office of Information Technology is currently networking the campus. Most academic and administrative buildings have been completed and a project is underway to network the 27 student residence halls. To support services that utilize this infrastructure, Enterprise Computing Services seeks a senior network analyst and a network analyst. These positions will obtain, develop and support software related to enterprise networking services.

Applications will be accepted until the positions are filled. Candidates should possess a relevant bachelor's degree; an advanced degree is preferred. In-depth knowledge of the networking internals of at least one multi-user operating system, preferably UNIX, is required. TCP/IP experience and two to five years advanced C programming experience are essential. More information about these positions can be found at: <http://www.nd.edu/~sexton/nw.html>.

Candidates should apply with resume and cover letter to:

Senior Network Analyst or Network Analyst  
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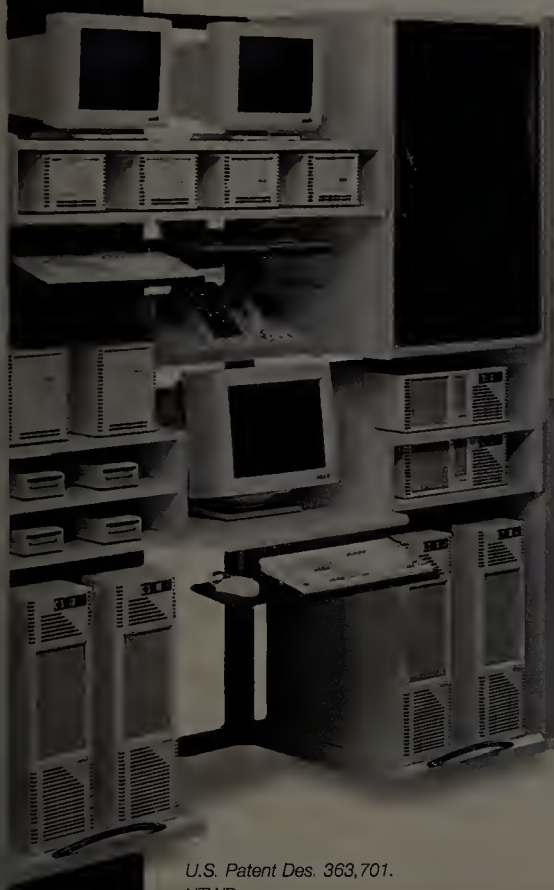
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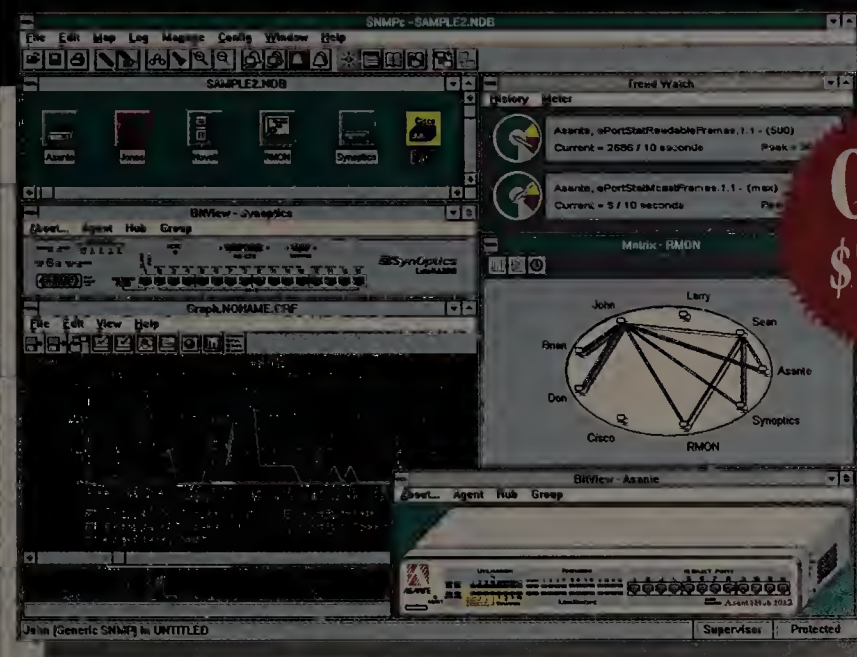
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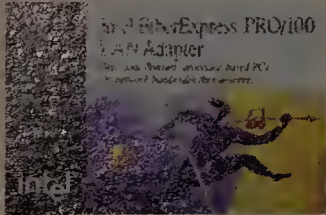


# 100 Mbps Fast Ethernet and Ethernet Switches

## Ethernet Adapters

### Intel

Ether Express PRO/100 32-bit (PILA8465)	
Single/5PK/20PK	\$165/870/3,100
Ether Express 10/100 PCI (PILA8465B)	
Single/5PK/20PK	\$148/895/2603
Ether Express PRO/100 32-bit EISA (EILA8265)	\$235



New Intel Smart 100 Nitro High Performance Server Adapter (PILA8485) ..... \$745

### Network

10/100 Mbps EISA (UTP100E)	\$370
10/100 PCI (UTP100P)	\$235

### 3COM

10/100 PCI (3C595TX) Single/5PK/20PK	\$169/754/2,740
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10/100 EISA (3C597-TX) Single/5PK	\$251/1228
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### Cogent

PCI Quartel, Full Duplex, 4RJ45 Ports (EM400)	\$1,137
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### SMC

10/100 EISA (SMC923DST)	\$240
10/100 PCI (SMC933DST)	\$212

### West Hills

10/100 PCI (WH500-TX)	\$145
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### National Semi Conductor

10/100 PCI Adapter ISA (NI7000-TI-01)	\$160
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### Asante

10/100 PCI Adapter for PC/MAC	\$199
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### Thomas Conrad

100Base-TX PCI Adapter (TCTX048)	
Single/6PK/50PK	\$195/1,115/9,251

## 100VG AnyLAN Adapter

### Thomas Conrad

100VG-AnyLAN ISA Adapter (TCVG045-UTP)	
Single/6PK/50PK	\$195/1,115/9,720
100VG-AnyLAN EISA Adapter (TCVG047-UTP)	
Single/6PK/50PK	\$195/1,115/9,720

### Katron

100VG ISA Adapter (DP-161)	\$149
100 VG EISA Adapter (DP-32E)	\$192

## 100 Mbps

### Hewlett Packard

100VG 16-bit ISA 10/100 (J2573A HP)	
Single/6PK/24PK	\$200/1162/4,434
100VG 32-bit EISA (J2577A HP)	
Single/6PK/24PK	\$246/1,428/5,437
100VG 32-bit PCI (J2585A HP)	
Single/6PK/24PK	\$216/1,268/4,094

## 100Mbps Macintosh

### Farallon

Fast Ether TX-10/100 NuBus (PN990)	\$328
Fast Ether TX-10/100 PCI (PN994)	\$240

## FDDI Adapters

### Cogent

PCI-SC Connector (EM100FX)	\$499
PCI-ST Connector (EM100FX)	\$499

### Network Peripheral

EISA (SAS) FDDI Adapter (NP-EIS-D50)	\$1,510
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### Efficient Networks

155.52Mbps PCI ATM Adapter with 512K Memory (ENI-155P-MF-C)	\$1,200
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### NBASE

Multimode to Singlemode ATM Converter, 20KM Single Link (Node Attach) (N420ATM)	\$3,995
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## 100Base-T Fast Ethernet Hubs

### NBASE

100Base-TX 8-Port Hub (NH108)	\$1,425
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### Network

100Base-TX 8-Port Hub (MICRO100)	\$1,350
Dual Speed Fast Ethernet Hub 24-Port (MICRO101/100)	\$3,565

### SMC

Tiger Hub 100 16-Port 100Base-TX Hub (SMC5116TX)	\$2,398
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### D-Link

100 Base-TX 12-Port Hub (DFE-812TX)	\$1,475
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### Asante

100 Base-TX 12-Port Stackable Hub	\$1,675
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### Bay Network

12-Port 100Mbps Hub (AT2202-001)	\$1,740
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### 3Com

100 Base-TX 12-Port Stackable Hub (3C250-TX/1)	\$2,028
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## 100 VG-Any LAN Hubs

### Thomas Conrad

24-Port 100VG-AnyLAN Hub (TCVG050-UTP)	\$2,625
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### Katron

100VG-AnyLAN Hub, 6-Port/12 Port (DP1006/OP1012)	\$840/1,330
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### Hewlett Packard

Advanced Stack 100VG 15-Port Hub, Stackable up to 16 Hubs (J2410A)	\$2,262
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## 10/100 Switches

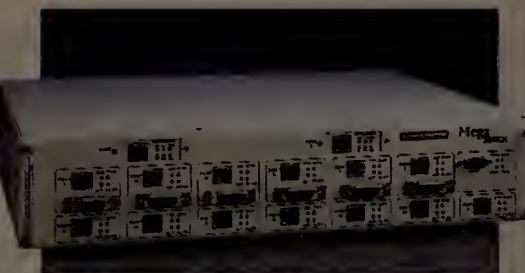
### NBASE

New MegaSwitch Seven 100 Mbps Ports, UTP and Fiber Capabilities (NH2007)	\$6,500
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### NBASE Switch

MegaSwitch 6 AUI/RJ45 Ports, Plus 2 Slots for NH200MP & SNMP (NH208-10)	\$3,499
MegaSwitch 6 AUI/RJ45, Plus 7 RJ45 Ports, Plus 2 Slots for NH200MP/SNMP (NH215-10)	\$6,999



100 Base-TX MegaPort Module for NH208/215 (NH200MP)	\$1,129
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### Xedia MAD SWITCH

Stackable Ethernet Switch, Six 10Mbit Ports Plus Slot for 100Mbit Fat Pipe (XE-XM-2410)	\$2,495
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### Kalpana

PROStack EtherSwitch Stackable Ethernet Switch, 16 RJ45, 2 expansion slots for high-speed modules, 10Base-TX/ATM (PSP16-M001)	\$6,370
(PSP16-M041)	\$7,095
100Base-T module for PRO16, 1 RJ45 (PSP100T)	\$1,100

### 3Com

24 Switched 10 Mbps Port, One 100 Base-T Fast Port (3C16900)	\$3,445
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### Plaintree

WaveSwitch 100 16-10Mbps 10Base-T Ethernet Ports, Two High-Speed Ports, Supports Standard SNMP Management Using SNMP, MIB, and the RFC 1493 Bridge MIB. 16-Port Ethernet Switch Base Unit 16 Ports (PTP110A)	\$6,700
100Base-T Interface Port (PTC217A)	\$2,250

VG-AnyLAN Port (PTC218A0)	\$2,250
FDDI Interface, Single Port SAS (PTC211A)	\$2,900



### WaveSwitch 100-8

8-Port Ethernet Switch Base Unit (PTP080A)	\$5,800
Pre-Configured with WaveBus Interface (PTP080A-01)	\$8,750
Pre-Configured with FDDI & SASI Interface (PTP080A-02)	\$6,300
Pre-Configured with FDDI & OAS Interface (PTP080A-03)	\$7,500
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10/100 Mbps UTP Switch, 16 RJ45 Supports	
10/100 Mbps Ethernet, Mode (28115)	\$14,450

## FDDI Switching Hubs

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### EIFO Client/Server Switching Hub

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FDDI over UTP Uplinks	\$3,700
Bundle Switch & FDDI Adapter	\$4,625



## Ethernet Network Adapters

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ISA RJ45/BNC/AUI (HT2002CT)	\$27
ISA BNC (ENET16C)	\$37
ISA RJ45 (ENET16T)	\$37



ISA RJ45/BNC (ENET16CT)	\$41
RJ45/BNC/AUI (HT2100PCI + PCI)	\$99
RJ45/BNC/AUI (HT2100VL VLB)	\$99

### SMC

ISA RJ45 (SMC8416T) Single/5PK/20PK	\$91/379/1,403
ISA BNC (SMC8416B) Single/5PK/20PK	\$91/379/1,630
ISA RJ45/BNC (SMC8416BT) Single/5PK/20PK	\$103/490/1,750
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EISA Combo (SMC-E32C) Single/6PK	\$201/1,127
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### Intel

ISA RJ45/BNC (PCLA8215) Single/5PK/20PK	\$110/510/1,900
ISA PRO/10 RJ45 (PCLA8220A) Single/5PK/20PK	\$94/418/1,510
ISA PRO/10 RJ45 (PCLA8225A) Single/5PK/20PK	\$106/450/1,655
EISA RJ45/BNC/AUI (EILA8225) Single/5PK	\$217/954
PCI RJ45/BNC (PCLA82) Single/5PK/20PK	\$162/767/2,807

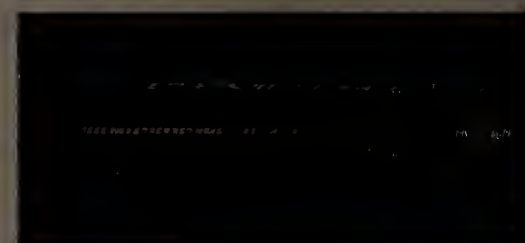
### 3Com

ISA RJ45 (3C509B-TP0) Single/5PK/20PK	\$39/145/1,639
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EISA RJ45 (3C579TP) Single/5PK	\$239/1,019
EISA BNC (3C579TP) Single/5PK	\$239/1,019
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## Hubs

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9-Port 10BT Palm Hub (ETHER9)	\$185
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24-Port 10BT Hub, SNMP Slave (NH114)	\$950
24-Port 10BT Hub, SNMP Master (NH114)	\$1,150

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12-Port 10BT Hub TigerStack (SMC3312TC)	\$550
12-Port 10BT Concentrator (SMC3512)	\$825
26-Port 10BT Hub TigerStack (SMC3326TC)	\$935

### Hewlett Packard

Advanced Stack 12-Port Hub (J2800A)	\$598
Advanced Stack, SNMP 12-Port Hub (J2830A)	\$930
Advanced Stack 24-Port Hub (J2801A)	\$972
Advanced Stack with SNMP 24-Port Hub (J2631A)	\$1,340

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# New Frontier Technologies Software Brings NetWare Users to the Internet

By ANN KRAUSS

Frontier Technologies Corporation has announced the first NT-server based product that offers Internet access, TCP/IP and host connectivity for Novell NetWare environments. Called CyberJunction™, the product combines an innovative transmission gateway with a robust suite of Internet and host connectivity applications. This enables NetWare clients to connect to the Internet and other hosts with speed and security without running TCP/IP on every desktop.

CyberJunction is bundled with Frontier's robust web server, SuperWeb™ Server, allowing NetWare users to improve internal and external communications through the World Wide Web. The client product includes Frontier's award-winning Internet applications from SuperTCP Suite 1.2 and SuperHighway Access 2.

CyberJunction provides IPX to IP bridging through a Windows NT-based server, eliminating the need for TCP/IP software on every desktop. This protects the users' investment in NetWare and avoids the extra administration required to manage dual IPX and TCP/IP protocol stacks on each client PC. Transmission speed for customers is dramatically improved. By utilizing an NT-based solution rather than a NetWare NLM solution, performance of the NetWare network is not impacted. Neither the NetWare server nor client have individual IP addresses, protecting the LAN from intrusion from the Internet. This product also prepares companies for a gradual migration to an open-system TCP/IP environment.

"CyberJunction demonstrates Frontier Technologies' continuing commitment to develop market-driven product solutions," said John Teitgen, president of Frontier Technologies. "There is a huge installed base of NetWare networks with users that want to experience the benefits of the Internet. CyberJunction is an extremely easy-to-install, powerful and cost-effective solution that allows NetWare users access to the Internet and to the corporate TCP/IP network. In addition, the SuperWeb Server brings the power of web technology to the NetWare environment, allowing companies to improve their communications both internally and with the outside world."

## CyberJunction Components

CyberJunction is a powerful NT-based IPX to IP gateway. The product is designed specifically for work groups, and includes a complete set of Frontier's award-winning TCP/IP and Internet applications, including a multi-protocol, commercial-grade browser, Internet organizer, MIME Email, telnet terminal emulation, FTP client/server, TN 3270, VT320, VT100 and remote utilities.

"CyberJunction fills a strategic gap in the market by providing Novell users with greatly improved connectivity and security, while at the same time giving their customers access to information via the World Wide Web," said Frontier Technologies senior product manager Joe Haley. "We provide a migration path to NT-based applications while protecting the embedded NetWare infrastructure."

Frontier's SuperWeb Server is a complete "enterprise information system." By combining client and server components, the SuperWeb Server dramatically improves the

level of communications between workgroups, customers, suppliers and vendors. "In a competitive world, information is a weapon that separates winners from losers," said Haley. "SuperWeb Server gives its users a competitive edge."

## Pricing and Availability

CyberJunction is available through Frontier Technologies' direct and reseller channels.

CyberJunction is sold in 5, 10, 20, 50 and 100-user packages; pricing starts at \$1795 for a 5-seat license. The SuperWeb Server is included with 50 and 100-user packages, and is otherwise available as an add-on for \$795 with 5, 10 and 20-user packages.

Frontier Technologies Corporation is a supplier of Internet, networking and TCP/IP applications for personal computers. Frontier's networking software enables individuals to be

more productive and business to be more competitive on a global basis. Headquartered in Mequon, WI, Frontier has offices in California, Pennsylvania, Europe and India, and employs more than 140 people worldwide.

CyberJunction, SuperWeb Server, SuperTCP Suite, Internet Organizer, SuperHighway Access for Windows and SuperHighway Access CyberSearch are trademarks of Frontier Technologies Corporation.



Photo by Tim Davis

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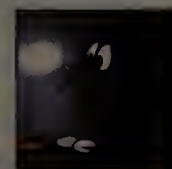
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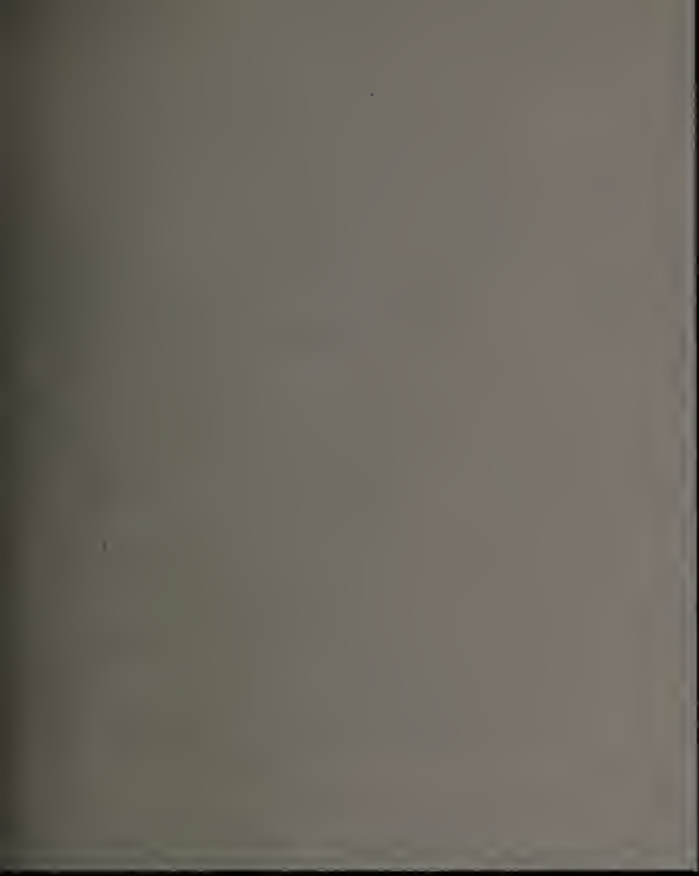
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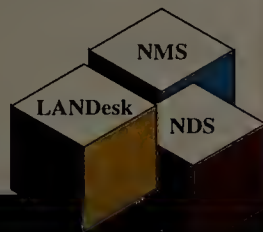
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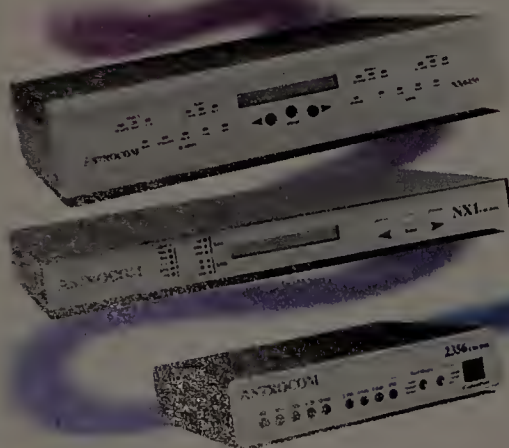
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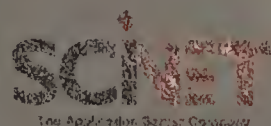
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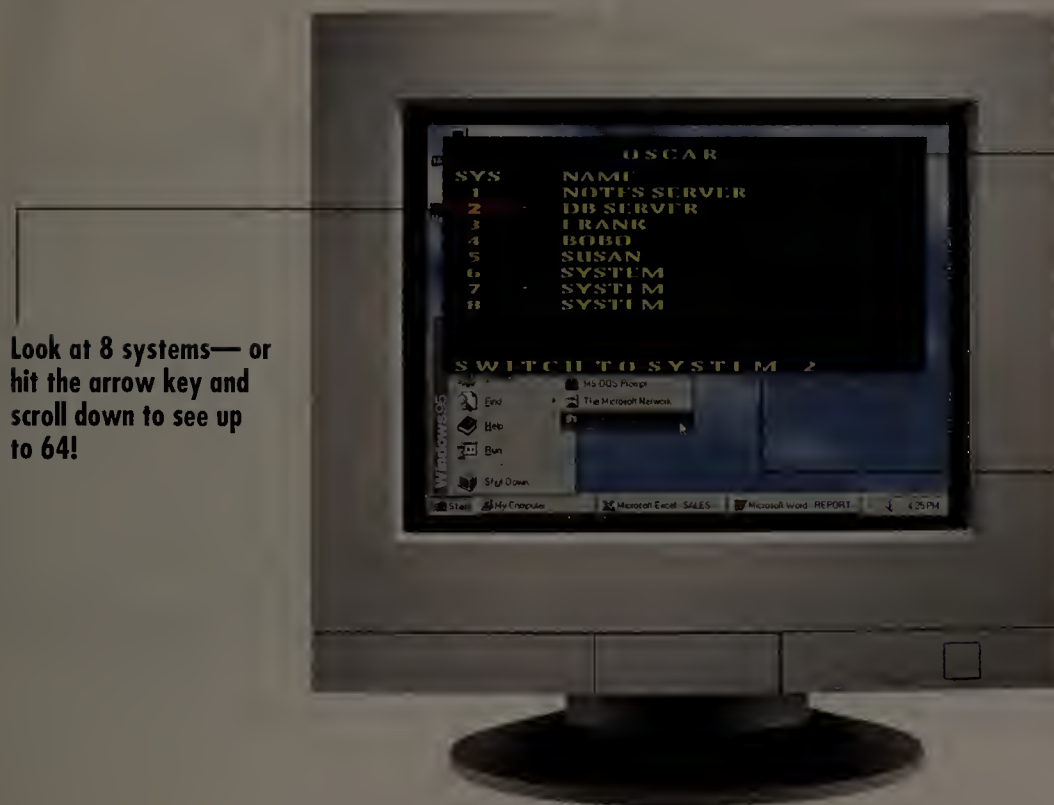


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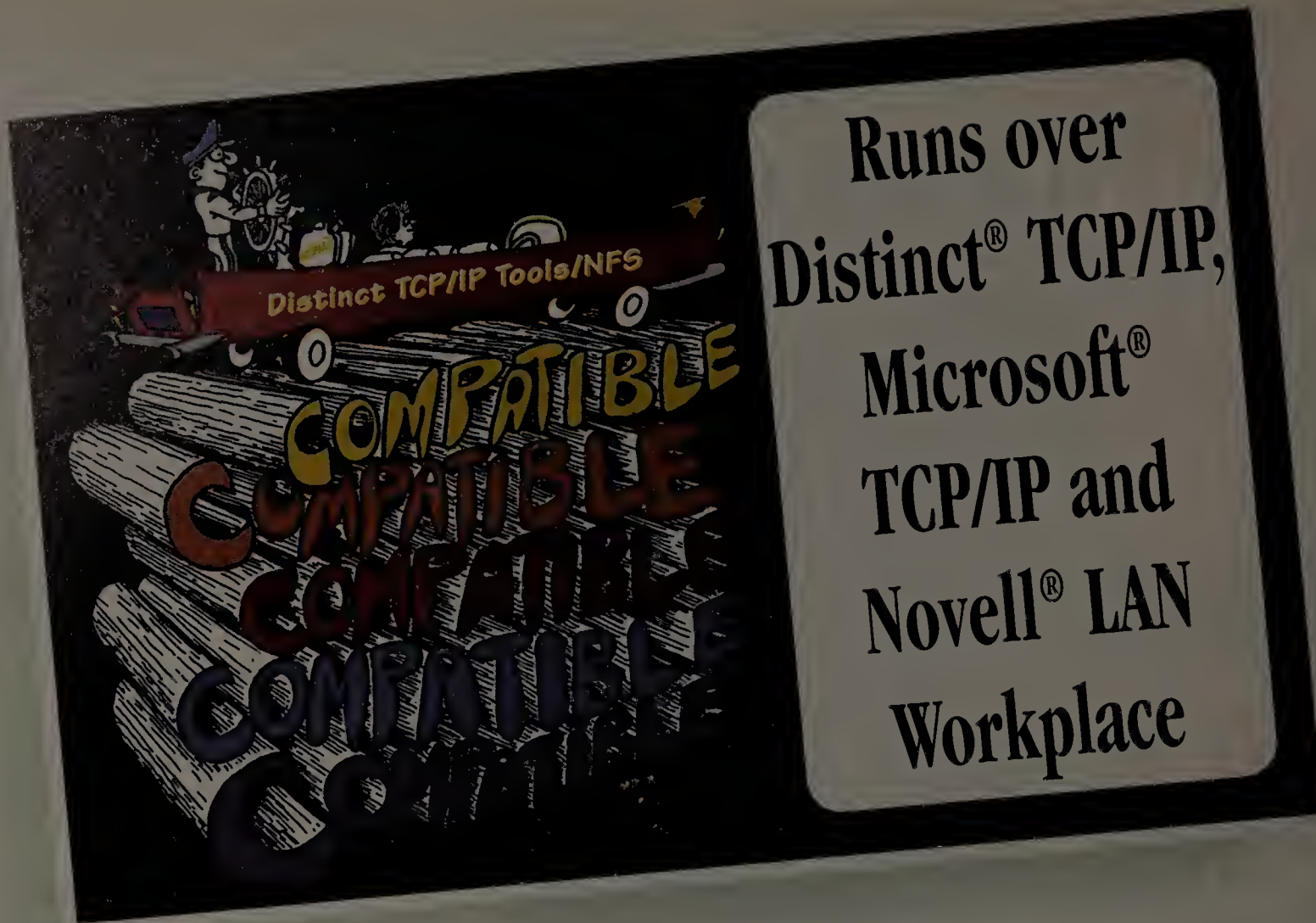
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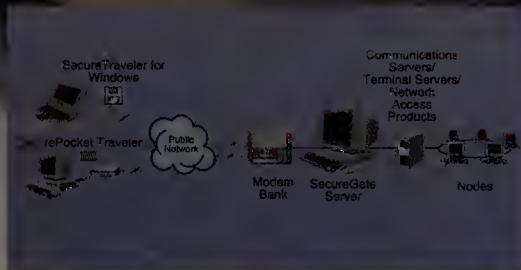
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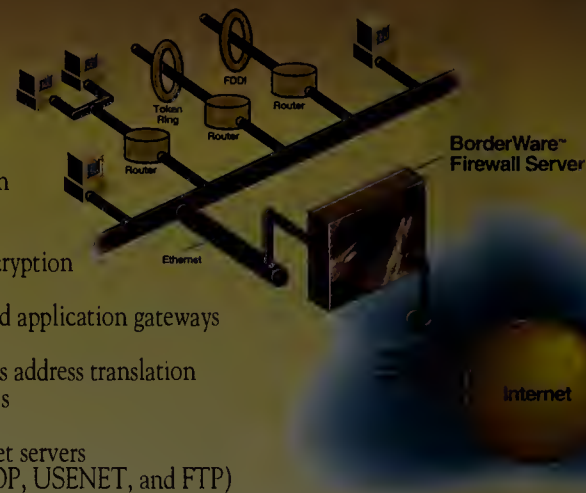
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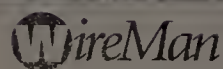
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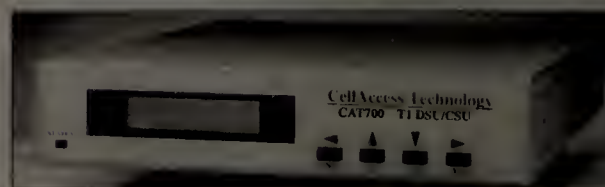
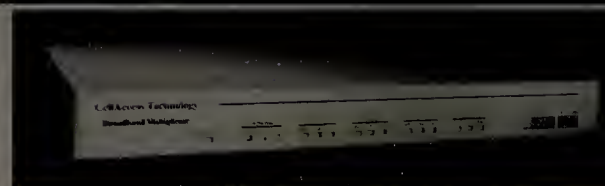
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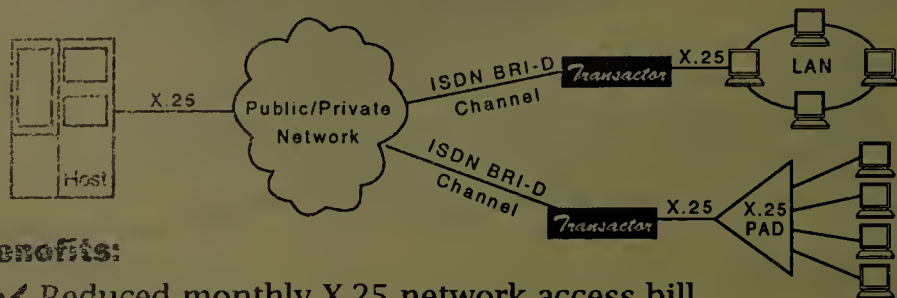
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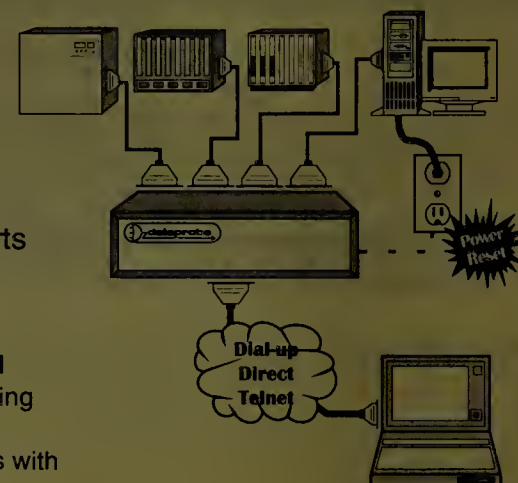
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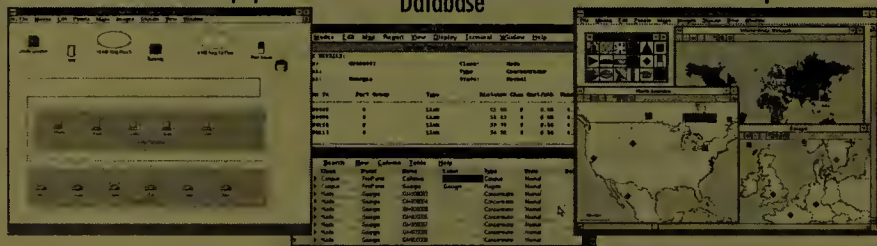
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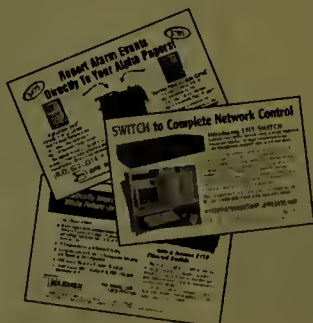
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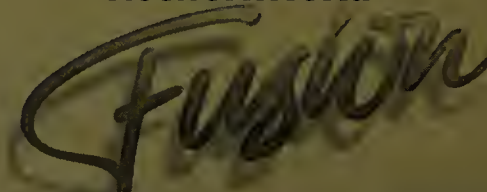


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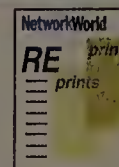
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## Exchange

Continued from page 1

Microsoft last week announced that local replication will be part of its Exchange Release Candidate 1 (RC1), a near-final version of the product that was expected to go into manufacturing late last week.

"It's one less thing that Lotus can point to and say, 'Look at those dummies, they don't even have this,'" said an official with a manufacturing firm planning

corporatewide usage of Exchange.

According to Microsoft, users have been clamoring for bidirectional client/server replication. And clearly, the competition's attacks have not gone unnoticed in the Microsoft camp.

"They've been running big ad campaigns about local replication," said Greg Lobdell, Microsoft's group product manager for messaging and Internet services. "Notes has it, Exchange doesn't."

But Lotus still can emphasize the fact that Notes, with its fourth version shipping soon, is the more mature product of the two.

"This is an example of one of the things they're working in at the last minute because they know customers won't take Exchange seriously without it," said Ken Bisconti, Notes' marketing manager. "They've never done this, so I wouldn't expect this to be stable for some time."

### Make or break?

Some Microsoft customers said local replication was not a make-or-break issue in their decision to go with Exchange. But they also said it is a feature they plan to use now that it will be available.

"We have a reasonably large traveling sales force, so local replication is a feature we're excited about," said Garth Keesler, staff consultant at Intergraph Corp. of Huntsville, Ala. "We were surprised Microsoft added it at this point."

Competitors saw Exchange's lack of replication as an opportunity. "They were getting killed," said Stewart Nelson, vice president and general manager of Novell, Inc.'s groupware division. "When they announced that they were pulling that out, there were people calling us say-

ing, 'Have you heard this? This can't be true.'

"We sat at Novell and said, 'That is literally like selling a car without a door,'" Nelson added.

Ironically, Novell's GroupWise will not have full client replication capabilities until next year, with its XTD release due in the second quarter.

According to Lobdell, Microsoft's Exchange Server will not have all the replication capabilities of Notes. For instance, Notes can replicate only the fields that change in a document, whereas Exchange replicates the entire document.

"On the flip side of that," Lobdell said, "the vast majority of groupware applications that

are in use today... use Word or Excel or WordPro or Lotus 1-2-3. And when you have an embedded document, field-level replication buys you nothing."

Local replication is important for an increasingly dispersed and mobile workforce. For instance, most users at Intergraph are in two- and three-person sales offices. The sales representatives run Windows 95 on laptops and dial in through the built-in Windows 95 Exchange client.

Keesler said local replication "should make their lives easier. They can log in, have a sandwich, download everything and go."

Curtis Olliff, systems/network coordinator for Alameda Ambulatory Care Services in Oakland, Calif., said the two-way synchronization will make it easier for his company to set up a remote Exchange hub. ■



Lobdell says Exchange Server will not have all the replication capabilities of Notes.

## Notes outsells cc:Mail 2-to-1

After years of being out-sold by cc:Mail, Lotus Notes has finally made the grade and is now outselling its E-mail sibling by nearly 2-to-1.

A Lotus spokesman said the Cambridge, Mass.-based IBM subsidiary sold 1.1 million Notes seats compared to 650,000 cc:Mail seats in the third quarter.

Despite the Notes surge, company officials insist they fully support cc:Mail.

In fact, cc:Mail 6.0 is due by the end of the year. The client is designed to run against a new cc:Mail Post Office, dubbed DB8, which offers around-the-clock uptime. DB8 will enter final beta testing this month, said new Lotus CEO Michael Zisman in an interview last week.

Meanwhile, cc:Mail 7.0 will go into its first beta cycle this month. The final product will follow the Notes 4.0 release since it will be based on Notes technology. Version 7.0 of cc:Mail will use Microsoft Corp.'s Messaging Application Programming Interface to talk to DB8, Notes 4.0 and Microsoft's Exchange Server, Zisman said.

Last week at EMail World in Boston, Lotus unveiled cc:Mail for Macintosh Release 3.0. It features several new messaging viewing and management features, including Droplets, which allow users to drop electronic mail folders and bulletin boards directly onto desktops.

Lotus also announced two access units: AU/cc:Mail for OS/2, available now, and AU/Notes for OS/2, to be available in the first quarter of 1996 for the Lotus Messaging Switch and SoftSwitch Central.

By Carol Shliva

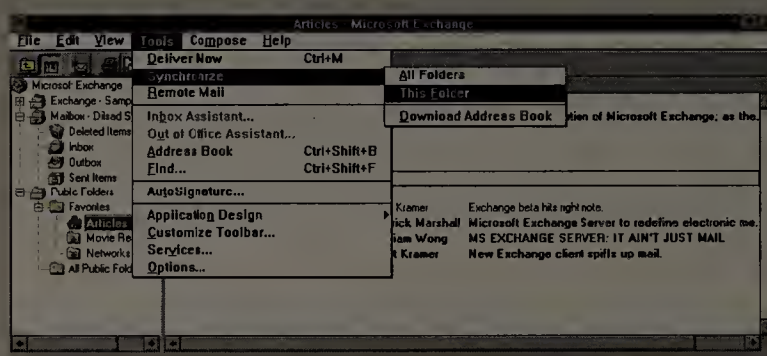
## How Exchange replication works

To make Microsoft Corp.'s local replication for Exchange work, end users create an "off-line store folder" at the desktop to hold data downloaded from remote connections.

This folder essentially contains a mirror image of information held on the server. Replication is most useful for mobile users, who can build folders based on which of Exchange's public folders they would like to retrieve while

traveling.

The off-line folder retains a link with the source folder on the server, which is the basis of Exchange's two-way synchronization. Once information on the remote clients has been modified, users can update the server in two main ways: bidirectional synchronization, where clients add fresh information to the server; and server updates to clients, which can be done manually or at preset intervals.



Exchange lets users choose what folders they want to synchronize.

## FCC

Continued from page 12

An FCC denial of the proposed investment in Sprint by France Telecom and Germany's Deutsche Telekom would probably force the three carriers to drop their proposed joint venture, putting Sprint further behind its rivals in seeking to meet multinational users' demands for seamless global nets.

And Scott Harris, the FCC's International Bureau chief, last week repeatedly said that the echo test would be "a real-world

test." For example, he said, the FCC would examine not just whether U.S. carriers are allowed to compete on paper, but also whether they can interconnect their networks with state-owned carriers — or at least be able to do so in the near future.

But the commission left itself enough flexibility to approve the Sprint deal or others if it wishes to. The FCC said it would automatically run an echo test only when a foreign carrier owns 25% of a U.S. carrier, although significant deals below 25% — such as the Sprint venture — would probably be subject to

the test.

And the commission allowed itself a giant safety valve to approve deals that fail the echo test if "additional public interest factors" outweigh the test results.

Still, three of the five FCC commissioners indicated strong concerns about bringing competition to global communications.

Commissioner Rachelle Chong said she "supported mightily" the new competitive test. Commissioner Andrew Barrett pointedly complained about difficulties that U.S. carriers have had in Germany not only

## GroupWise ship date slips

The release date for Novell, Inc.'s next version of GroupWise — known as XTD — has been pushed from the first quarter of 1996 to the second quarter.

"We're saying second [quarter] to be safe," said Stewart Nelson, vice president and general manager of Novell's groupware division. "Better safe than sorry in this business."

Novell officials declined to pinpoint any specific reason for the delay, only noting that beta testing has taken longer than expected.

One twist with the XTD release will be the "componentization" of the product, whereby a customer can buy applications on an a la carte basis rather than buy the entire groupware package.

"You don't have to buy the kitchen sink to get what you need," Nelson said. "You can buy the E-mail component, the document management component, the scheduling component separately, if you like. But if you buy them together, they work as one."

Other new areas include:

- An Internet-related announcement by the end of January.
- Support for TCP/IP and IPX/SPX between client and server to provide increased security and scalability.
- Merging of the Message Handling Service (MHS) transport and the GroupWise transport into one message transport agent.

By Carol Shliva

gaining licenses to compete against DT, but also getting franchise and access rights from German city governments.

And FCC Chairman Reed Hundt answered recent worldwide protests that the FCC is using its power to influence foreign governments by, in effect, pleading guilty.

Harris did seek to soften the appearance of a diplomatic conflict. He said the FCC would adjust its policy to conform to any agreement resulting from current negotiations in Geneva on a worldwide telecommunications trade pact. ■



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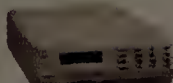
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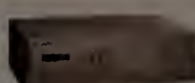
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# 3Com touts three-phase virtual network strategy

By Jodi Cohen

Santa Clara, Calif.

3Com Corp. unveiled its strategy to let users build virtual networks at the VLANs: Virtual LANs and

## NetworkWorld

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Second-class postage paid at Framingham, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #0385662. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

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ISSN number: 0887-7661.

Switching conference here last week.

3Com's three-phase strategy, dubbed Transcend Virtual Networking, will be deployed with the company's switches, hubs, routers and management gear.

### Phase 1

This phase allows users to configure multiple VLANs by port within each switch as well as establish VLANs across multiple switches. In addition, administrators will use a common graphical VLAN management



Gottlieb said the desktop approach to distributed RMON is unique.

application within 3Com's Transcend network management platform.

The Cellplex 7000 Asynchronous Transfer Mode switch and LinkSwitch 2700 Ethernet-to-ATM switch are now shipping with all Phase 1 features. The LANplex family of switches now supports VLAN features, with full management support expected by mid-1996. The LinkSwitch family and the switching in the recently acquired Chipcom Corp. ONcore enterprise hub will have these features by mid-1996.

### Phase 2

The second phase allows users to define VLANs based on collections of users by using media access con-

trol (MAC) addresses, rather than determining VLANs via switch ports. 3Com also will add a feature that will allow users to automatically configure VLAN membership by protocol type, subnet and MAC address.

But analysts said the most important feature is distributed Remote Monitoring (RMON). 3Com will arm its network adapter cards with the SmartAgent-based RMON, which will allow the desktops to monitor the network by automatically reporting usage, errors and performance information to the net management station.

Andrew Gottlieb, 3Com's director of marketing for LAN internetworking, said the desktop approach to distributed RMON is unique since other vendors are implementing RMON on a switch level.

"Leveraging the desktop to

provide automated management is a more efficient use of bandwidth than requiring routing in every switch," he said. 3Com will work closely with IBM to create a common set of APIs that will give adapters the intelligence to tell the switch to which VLAN it belongs.

3Com plans to integrate Phase 2 features into its products beginning the second half of 1996.

### Phase 3

The final phase of the Transcend Virtual Networking strategy, to start in 1997, allows users to automatically configure VLANs across both ATM and non-ATM environments. Also, 3Com will roll out policy-based virtual network support that will enable users to set up VLAN membership based on manager-defined policies. ■

## Analysis

# Strategists peer into the three faces of virtual LANS

By Jim Duffy

Santa Clara, Calif.

Though virtual LANs represent one of the hotter topics in the industry today, early adopters cautioned users to do a lot of homework.

Three VLAN pioneers last week shared their trials and tribulations with fellow users at the VLANs: Virtual LANs and Switching conference here. They discussed how and why they configured their VLANs and the many design options available.

Though the strategists configured their VLANs differently, they all agreed on one thing: VLANs can raise more questions than answers and may not be worth the headache for some.

"Research as much as possible," said Jay Wilson, senior advisory systems engineer at AG Communication Systems in Phoenix. "You need to look at what is reality and make sure you have the same expectations that management has."

VLANs can be configured in three ways, each with its own advantages and drawbacks. Users can establish VLANs by assigning specific router and switch ports to specific VLANs, or logically group endstations based on media access control (MAC) addresses or network addresses.

### Port assignment

The benefit of establishing

VLANs via port assignment is the ease with which they can be set up. Once it is determined which stations are to participate in which VLANs, the corresponding ports are simply dedicated to those VLANs.

But this type of static configuration makes endstation mobility burdensome. Endstations cannot be moved without reconfiguring the VLAN, which requires the intervention of the

allow us to integrate with the rest of the campus," Schilling said.

### Little MAC

Defining VLANs by MAC address enables mobility because the address moves with the endstation. But membership is still static because network administrators have to manually enter each endstation's 48-bit address into VLAN configuration applications.

AG Communication Systems employs the MAC-layer approach because it uses an Asynchronous Transfer Mode backbone with emulated LANs, said Jay Wilson, senior advisory systems engineer. LAN Emulation (LANE) is an ATM Forum speci-

LANE is that you have to watch out for your protocols," he said. Vendors can handle IP pretty well, but for special circumstances like LU 6.2 in an 802.3 frame, "you'll find some vendors who can't pass it."

### Net addresses

A third way to configure VLANs is to group endstations into virtual subnets based on their network layer address or protocol, such as IP or IPX. The benefits are dynamic membership — endstations are automatically assigned to a VLAN, and as stations are moved, they are automatically reassigned to the appropriate VLAN.

But it is difficult to assign endstations to multiple VLANs because the network address is still bound to the endstation.

Nicholas Heilweil, senior network analyst at J. Paul Getty Trust in Los Angeles, has also found that for applications such as multicast video, multicasting behaves more like broadcasting, sending data to more endstations than intended and putting a burden on the WAN.

To alleviate the multicast video problem, the Getty Trust set up its VLAN to support multicast distribution based on predefined rules and policies. These rules automatically assign endstations to VLANs based on one or more of the three VLAN assignment options — port, MAC and network address. They also enable movement of endstations without VLAN reconfiguration, Heilweil said.

"It will help us keep this system rolling along without needing network managers to intervene," he said. ■



VLAN strategists (l. to r.) Nicholas Heilweil, Michael Schilling and Jay Wilson say the technology raises more questions than it answers and may not be worth the headache.

network administrator.

University of California at Los Angeles Business Enterprises (UCLA BE) currently has its VLAN configured by port assignment because students use the system from their dorm rooms and don't move around much. But UCLA BE expects this configuration to change next year, said Michael Schilling, director of technology.

"We're likely to move toward dynamic [VLAN] assignment to

fication for mapping the MAC addresses of shared-media and switched LANs into ATM addresses.

Despite having to compile and maintain addresses, the MAC layer-based VLAN has reduced manual intervention required for office moves and reduced unauthorized network changes by 95%, Wilson said.

But all LANE implementations are not the same, Wilson warned. "One of the things with



## DMS

Continued from page 1

It wants interoperability in groupware features, too, "features such as font types and rich text; we want to be interoperable in Notes and Exchange," said Wayne DeLoria, DMS integration manager at the agency. "We want maximum interoperability in groupware."

The Defense Department is funneling its groupware ultimatum through Loral Federal Systems, the prime contractor on DMS, whose job is to get subcontractors such as Microsoft and Lotus in line.

Microsoft declined to comment on Exchange DMS since the product has not been officially announced. But according to Lotus' Ken Bisconti, Notes product manager, Notes public folders could be converted into Exchange through use of a translation gateway.

"But the limitations are largely on the Exchange side," Bisconti said. "Notes uses database replication, but they only have message replication between the servers, and you can't do it selectively. In Notes, you have field-level replication."

Microsoft last week, however, announced that client replication will be integrated in Exchange, set to ship in the first quarter, but the system will not replicate down to the field level.

Notes can be made to work with

Exchange much in the way the InterNotes WebPublisher 2.0 works by converting Notes to HTML, Lotus argued.

But the bottom line is, "you would be limited with what you could do with Notes," said Bisconti, adding that a simple discussion database could be successfully translated but not complex Notes applications.

The Defense Department, which now uses 47 different E-mail systems — 45 in

the Pentagon alone — is fed up with proprietary systems, Clarke said. "Gen. [Emmett] Paige can't even [E-mail] his associates in the same building for this reason," he added.

The three messaging vendors under the DMS contract — Microsoft, Lotus and Enterprise Solutions, Ltd. — were already required to ensure baseline interoperability in the client/server and directory software that each is scheduled to deliv-

er to the Defense Department by this spring.

The Defense Department wants not only Lotus and Microsoft, but the entire messaging and groupware industry, to supply the military with DMS-compliant products. To that end, DISA next month will post DMS specifications on the DISA Web home page "so everyone will understand what it means to be DMS-compliant," Clarke said. ■

## NT Server

Continued from page 44

ple who wanted to be able to work at home and employers who thought it might be a good idea.

For many, however, the idea was put on hold because the infrastructure could not support the idea. Communication over typical telephone lines was too slow and expensive, and productivity gained from cutting down on commute time was lost waiting for a remote machine to respond.

ISDN solves these problems. Its quick connect time means lines can be brought up only when needed and dropped as soon as the communication is finished. Its speed, especially when channels are aggregated, offers response times that should keep users happy. Equipment costs are continually dropping, and with the new supplemental standards such as NI-1 and IOCs, installation is almost routine. Even the regional Bells are coming up to speed with dedicated, 800-number ISDN order lines.

The time for ISDN is now.

Kalman is a partner in TigerTeam, a company specializing in helping corporations migrate to the new Windows platforms. He can be reached via E-mail at 76702.3564@compuserve.com.

Stratus



Ultrix



HP/UX



Solaris



Auspex



SunOS



NetBSD



Linux



Pyramid



IBM AIX



NeXT



Distinct



IRIX



Unisys



SCO UNIX



Tandem



NetBSD



Linux



Univel



Process



Cray



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Wollongong



HP/UX



Unisys



NetManage



HP



HP/UX



TGV



Pyramid



FTP



Solaris



Distinct



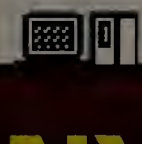
Tandem



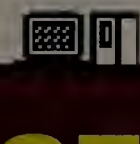
Auspex



SunOS



IBM AIX



SGI



Digital UNIX



Univel



HP/UX



NeXT



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Linux



Pyramid



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## SO MANY SERVERS

NFS/Share™ allows Macintosh users to take advantage of distributed file sharing in a multivendor environment. Based on Sun Microsystems' Open Network Computing/Network File System (ONC/NFS), NFS/Share provides seamless access to NFS-supported services such as UNIX files, IBM mainframe systems, VMS hosts, and PC servers.

## IN SO LITTLE TIME

NFS/Share is the fastest NFS client on the market for the Macintosh, approaching file access rates of one megabyte per second—the equivalent of 250 pages of text per second! NFS/Share is an essential tool for any company that requires large file sharing across a network. With its seamless connectivity and ease-of-use, NFS/Share minimizes info-sharing hassles and maximizes profits.

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# Back to Reality

## PGP key signing is one holiday party that techies can appreciate

**A**h! The holiday spirit is in the air. It's a happy time for most — except for you technical scrooges. You'd rather plan the next network upgrade, instead of attending holiday socials with your significant other.

Smart networking gurus are skipping town this week. About 750 (mostly guys) are holding their own party in Dallas under the auspices of the Internet Engineering Task Force's (IETF) 34th quarterly conference.



David J. Buerger

Tuesday night is MCI's Apparel Mart party, featuring live Texas-style blues, an eclectic menu (for carnivores and vegetarians alike), an open bar (for part of the evening), arcade-style video games, pool tables and a sketch artist. (I am jealous that attendees will get a world tour T-shirt displaying dates and locations of every

IETF event.)

But MCI's bash is just a warm-up. The really cool event — better than Dallas' West End, according to one engineer — is the PGP Key Signing Party on Wednesday night.

### Keeping a secret

PGP is Phil Zimmermann's free Pretty Good Privacy encryption software. The Feds hate it because it works so well and is available worldwide. You can find instructions on how to get the software via FTP at net-dist.mit.edu in the /pub/PGP directory.

PGP creates security with secret and public keys. The keys allow people to encrypt and digitally sign E-mail or computer files. Keys are likewise required to unlock encrypted goods when they reach their destination.

Like any public-key encryption scheme, PGP requires senders to know the public keys of recipients. Data is encrypted using the recipient's public key and can only be unlocked using the recipient's private key. But there is no way to know if the public key actually belongs to the person it is said to belong to, opening up possibilities of fraud.

The IETF's Key Signing Party is a 2-year-old social event with a serious mission: to authenticate public keys.

Preparations for the key swap started weeks before the event. The gracious organizer is Ted Ts'o, a systems pro-

grammer at MIT who heads Kerberos Version 5 development.

Ts'o accepts E-mailed copies of public keys until 6 p.m. Wednesday. After 10 p.m., swappers can download the complete "public key ring" from a computer at MIT. Each party-goer is supposed to show up at 10:30 p.m. with a "fingerprint" (photocopy) of their public PGP key. That's when Ts'o passes out photocopies of the mailed-in public keys.

Still with me? Now comes the good part. Each person then stands, one by one, and reads off their key fingerprint (a list of characters) so that everyone can verify the authenticity of their public key. Early drinking can seriously hamper this meticulous ritual.

Well-known old-timers zip through the ceremony. If no one can vouch for the identity of a newcomer, that person must provide other means of identification. Bottle suckers with revoked licenses could have a problem.

Informed sources say that, after exchanging keys, everyone will take a cab over to the West End, then the real parties will start. Revelers will bring laptops with which they'll digitally sign new keys over pizza and root beer. This will complete the enlarged "Web of Trust" and enable participants to exchange

encrypted messages.

Alert readers will notice that creating secure communications requires a high — and perhaps unrealistic — degree of individual paranoia and sober effort.

Maybe the paranoia isn't so misplaced. No one knows for sure how much money is lost to digital snooping. I've seen studies claiming that it's \$8 billion a year. It's hard to say. After all, who wants to publicly admit, "Hey! We were really ripped off because of our lax security! Do I still get my annual bonus?"

The key-signing party also violates the two cardinal rules of a good social event:

■ To the best of anyone's recollection, a real party was more fun.

■ No one can recollect very much.

Nevertheless, perhaps we should hold more key-signing parties at other industry events. Ts'o has offered to help people organize their own key-signing event. You can reach him at tytso@mit.edu.

As the world becomes more civilized, it needs to put more things under lock and key. Security is a hassle. At least it's a good excuse to throw a party that techies can appreciate.

Buerger is an Atlanta-based writer and industry consultant. He can be reached at dbuerger@pipeline.com.



## CyberSpeak

Voices from the  
reader network

### NEXT QUESTION

What do you think of  
Cabletron's plan to buy SMC's  
switching business?

Responses due by 8 p.m. Thursday, Dec. 14.  
You'll get a T-shirt if we print your  
response. Please include your name, title,  
company and address.

## Will Web browsers become the much-sought-after universal network client?

■ "It won't be a Web browser as we know it, but it could be a browser with the power of a true client. Current Web browsers let you get to different sites, but now you're trapped into using apps people have written for that site environment."

Mark Hawkins, information systems manager, Augusta Newsprint Co., Augusta, Ga.

■ "Yes, they will. However, they will not be so much Web browsers that are separate software as intrinsic tools built into existing applications. For instance, you could click on a box in your word processor to search the Web for information you need, as if the information was local."

Curtis Olliff, systems/network coordinator, Alameda Ambulatory Care Services, Oakland, Calif.

■ "It's a leading candidate. There's kind of one track that says I'd like all these proprietary things integrated and there's another

one that's kind of built on the Internet model that's much more open. I've seen little glimpses of [the Internet model] within our corporation, but we haven't really leveraged that in any sense."

Terry Mackin, manager of desktop technologies, Mervyn's, Hayward, Calif.

■ "Not in their current form. There's a lot of things that have to come along before that'll happen. There's technology that doesn't exist, mostly things like how to pay electronically. Until that happens, Web browsers are probably more of a fad."

David Fischer, consultant, The Drummond Group, Fort Worth, Texas

*NEXT WEEK: Don't miss "Abend," our back-page column that alternates with "CyberSpeak" and brings you humorous items, oddities, marginalia and other insights from the Internet and elsewhere. Send items to network@world.std.com or get in touch with us any other way listed on page 5.*



2:24<sup>PM</sup>

10,000-page run under way.

2:25<sup>PM</sup>

Printer speaks to you in strange  
new language.

ER uppp ER uppp ER uppp ER

2:26<sup>PM</sup>

Call service supplier and try not to panic.

5:16<sup>PM</sup>

Service guy finally arrives.

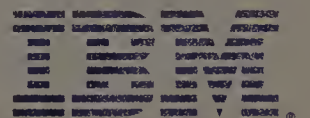
5:59<sup>PM</sup>

Can't help, he says, it's a network thing.

6:00<sup>PM</sup>

Panic. Visualize IBM printers to calm down.

Within-the-hour access to IBM printer specialists, not  
catchall generalists. Specialists who can help even when  
it turns out to be a network, not a printer problem.  
And whose expertise keeps you covered 24 hours a day,  
365 days a year. That's all standard with IBM. You have  
client/server printing needs, we have a host of laser and  
impact printers to meet them. Such as the 30-ppm IBM  
3130 laser printer, which handles up to  
seven paper sizes as well as 2,500-  
sheet output and 3,000-sheet input. To  
learn more about a range of products  
and services you won't find anywhere else, call  
1 800 IBM-3333, ext. IA036. Or visit our web site at  
<http://www.canada.ibm.com/ibmprinters>







*"I never know what the company's going to ask of our NETWORK, so I just tell 'em, 'Hey, we're FLEXIBLE.' HP AdvanceStack 10BASE-T hubs keep me honest."*

I was one of those kids who had an HP calculator at the ready constantly, and I knew the words Hewlett-Packard stood for quality and reliability. But when it comes to the world of networking, that's only part of the HP story, as I soon discovered.

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Richard Lee  
Director of  
Operations  
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- Full stack manageable via a single SNMP module
- Supports HP OpenView network management software



- Each hub ships with HP Stack Manager, a Windows<sup>™</sup>-based management solution
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- Hub-to-hub connections via industry standards-based cables
- 185-meter hub separation capability
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